



GARD Briefing on the Affinity Water revised draft WRMP

6th April 2019

In a nutshell

Affinity Water has not proven the need for the Abingdon Reservoir at any date before the late 2060s, and there is no case for its construction starting early. There are other, more flexible, and more quickly delivered solutions to the possible supply shortages in Affinity's central zone from the mid-century onwards, if indeed these arise at all. There are simpler, less costly and faster ways of achieving more chalk stream relief than Affinity's plan, without waiting for Abingdon reservoir, which may never be needed at all for supplying Affinity's customers.

Executive Summary

- Statements have been made by Affinity Water and Thames Water that the Abingdon reservoir is required early to reduce abstraction from chalk-streams. However, Affinity's **own plan** proposes a much faster way of achieving this, by 2025, by fully utilising water from their existing connection to Anglian's Grafham reservoir. **Affinity Water should make clear to all stakeholders that chalk stream sustainability reductions can be achieved by 2025, without waiting until 2038 for the reservoir.**
- Unrealistically high population forecasts have been used to calculate Affinity's demand. In particular they fail to take account of local authorities' actual historical house-build rates. Using such achieved rates could reduce Affinity's demand by over 100 Million litres per day (Ml/day).
- Affinity's leakage rates are unacceptable. They are much higher than companies that serve similar areas and their plans for reductions are too low and too slow. They are refusing to meet the Ofwat target of 50% reduction by 2050, only offering 40%. At a minimum, reductions should meet or exceed Ofwat targets.
- Affinity's plan proposes an unacceptably low reduction in water consumption, well above the industry norm. Metering efforts are inadequate, and poor compared with other water companies. They plan to continue to install 'dumb' water meters long after these have been abandoned by other companies in favour of smart meters (which reduce consumption by more than 10%). Some of their zones show an unjustified increase in consumption after Abingdon reservoir would come into service.
- Adopting combined industry norm targets for leakage and water consumption would reduce Affinity's predicted demand in 2080 by over 140 Ml/day.
- Affinity's '**Supply 2040**' scheme allowing transfer of water from South to North of their Central Region, is welcome and should be brought forward to increase adaptability in responding to any increased demand, allow larger, quicker reductions in chalk stream abstractions and improve the ability to manage London supplies.
- Even using Affinity's figures (which GARD disputes), the Affinity Central Region has a surplus of 25 Ml/day in 2038, when it is claimed Abingdon Reservoir is needed. In fact, Affinity's own figures show it does not need a new source of water until the early 2050s.
- GARD proposes a three-phase solution for Affinity to increase its water supply and relieve chalk stream over-abstraction which is efficient and deliverable much sooner than Abingdon reservoir.



- **Phase 1:** Using the **Supply 2040** network, Affinity could transfer the 25 MI/day water surplus from its southern zones, which are in surplus, to its northern zones where there is a predicted shortfall. About 70% of water supplied to Affinity's northern zones is returned as treated effluent to the lower River Thames and Lea and would be available for use by Thames Water to supplying London. Both Thames and Affinity omit this from their water balance plans.
- **Phase 2:** The transfer of up to 15 MI/day from Thames Water's extraction licence for its Slough-Wycombe-Aylesbury (SWA) zone at Sunnymeads to the neighbouring Affinity zone. This is possible as SWA zone is in surplus up to the 2080. Again at least 70% of this source would be returned to the Thames Water London zones.
- **Phase 3:** Affinity could connect to the Thames Water Queen Mary reservoir and, using pipelines and water treatment plants already planned, transfer up to 100 MI/day of water via the Supply 2040 network to their northern central zones, to meet their deficits and provide further chalk-stream relief. Once again, over 70% of this water will be returned as treated effluent to the Thames inputs to the London supply. A probable 90% of the enhanced chalk-stream flows will also be returned.
- The Abingdon Reservoir is a very bad deal for Affinity customers. They would be charged 100% of the cost of water supplied to them by Thames Water from the Abingdon reservoir (in the form of their share of the project's costs). However, because of the return effluent flows going back to the Thames Water London system, they are in effect only using a net 30% of water supplied.



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Overall Remarks

Affinity Water announced in September 2018 that they intend to partner Thames Water in the promotion and construction of the Abingdon Reservoir (which the two companies now call the 'South-East Strategic Reservoir' (SESR)).

Affinity have published their revised draft Water Resources Management Plan (rdWRMP) and links to this can be seen at: <https://stakeholder.affinitywater.co.uk/have-your-say.aspx>
The plan is out for public consultation, and the closing date is **26th April 2019**.

The importance of understanding the plan and making criticisms of/opposing it is that the supposed needs of Affinity's central water zone (covering essentially Hertfordshire and parts of Buckinghamshire and Surrey) are being put forward as the prime reason for early construction of the Abingdon Reservoir, starting in 2025 and completing in 2037.

GARD has analysed the plan and will be submitting its response. The bottom line is: ***Affinity Water has not proven the need for the Abingdon Reservoir at any date before the late 2060s, and there is no case for its construction starting early. There are other, more flexible, and more quickly delivered solutions to the possible supply shortages in Affinity's central zone from the mid-century onwards, if indeed these arise at all. There are simpler, less costly and faster ways of achieving more chalk stream relief than Affinity's plan, without waiting for Abingdon reservoir, which may never be needed at all for supplying Affinity's customers.***

Below we give the facts of our analysis to back this up. We do not re-iterate all the problems we identify with the Abingdon reservoir project *per se* (whether the serious environmental and construction disturbance issues, or the reservoir's lack of resilience to drought and enhancement of local flooding risks). We have previously issued a briefing on this, in the TW consultation,¹ and distributed to councils and campaigning organisations. All these arguments against the Abingdon Reservoir are still valid against the AW plan.

Relief of Chalk-stream abstraction

1. The 'headline' of Affinity Water's (AW) and Thames Water's (TW) case for early construction of the reservoir is the need to adhere to the Environment Agency's orders to reduce the abstraction from a group of over-abstracted chalk-streams in Affinity's central zone within the next decade.

¹ 'GARD Briefing for Councils: Thames Water revised draft Water Resources Management Plan', GARD, 14.11.18. The full argument is on the GARD website at <http://www.abingdonreservoir.org.uk/downloads/GARD%20%20response%20to%202nd%20Consultation%20on%20TW%20draft%20WRMP%20Rev%2029.11.18.pdf>



2. AW and TW have allowed the fiction to propagate that satisfying this environmental order requires early construction of the Abingdon Reservoir. This has led to well-publicised calls by several river and angling lobbies for the reservoir to be built to reduce the need to abstract water from stressed chalk streams.
3. We wish to state categorically that GARD supports the aim to reduce significantly chalk-streams water-abstraction: they are a rare habitat, and the over-abstraction of many streams in the south-east has left many in a dire state.
4. However, GARD has long maintained that there are many, much quicker ways of delivering relief for chalk-stream abstraction. Now, *Affinity's own plan* actually proposes a much quicker way of achieving the EA's required reductions (rather than waiting for the Abingdon reservoir) by fully utilising an existing water supply from Anglian Water's existing Grafham reservoir.²
5. ***Affinity and Thames should make clear to concerned stakeholders that planned sustainability reductions for chalk streams will be in place by 2025, rather than having to wait until the late 2030s for the reservoir.***
The encouraged persistence of this 'fake news' aspect of the TW/AW plans is simply not acceptable.
6. ***GARD recognises that the chalk stream reductions agreed to date only address some of the chalk stream abstractions – more reductions may be necessary.*** GARD has proposed a solution that would allow much more reduction than currently planned, without the need for Abingdon reservoir. GARD's proposal makes use of the fact that about 90% of the chalk stream abstraction reductions will flow back to London, via enhanced chalk stream flow and the lower Rivers Thames and Lea, and will be available for London's supplies.

Over-estimation of demand and inadequacy of proposed demand-management measures in the Affinity Plan

Population Forecasts

7. In common with the TW plan, Affinity's forecast for the rate of increase in population is based on local authority house building plans that often struggle to achieve even 40% of what is planned. Adjusting the planned figures by 'real world' achievement rates would reduce the forecast increases in population by up to 50%. From the Affinity figures in table 1, this would imply up to 800,000 lower population, and over 100 Million litres per day less water demand.
8. Current long-term trends in the UK population are downward with reducing fertility and stalled longevity increases. Other European nations such as Germany and Italy are already seeing falls in their natural population with levels only maintained

² Affinity revised dWRMP, pages 49 and 50. The actual text is: "*The water available for supply is reduced [by the EA's imposed removal of chalk-stream licences] by 33.7 MI/day by 2024/5 as a result of sustainability reductions; this is off-set by use of our full statutory entitlement of Grafham Water from 2024/5 onwards following installation of conditioning treatment at Sundon.*"



through immigration. The UK population fell in the 1970s and could do so again. Large projects that add unnecessarily to customer bills and have an adverse environmental impact should not be considered until the need has been proved absolutely.

Leakage Reduction

9. AW has a poor record on leakage and their plan lacks ambition to improve this.
10. Despite a large percentage of newer housing stock in their region, AW leakage rates are above most other water companies. Their leakage rates are 59% higher than South East Water, who cover similar areas (8.1 m³ per km of pipe per day compared to SE Water's 5.1). To compare nationally, their leakage per property is 8.4 litres per property per day, whereas the national average (excluding TW, who are by far the worst!) is 6.3 litres per property per day.
11. The National Infrastructure Commission (NIC) and Ofwat have set water companies a leakage reduction target of 50% between 2020 and 2050. While all other water companies have accepted this, Affinity's revised draft Water Resource Management Plan only aims to achieve a 40% reduction by 2050.
12. Given that AW's leakage rate is higher than most other water companies, they should aim for a greater than 50% reduction in their leakage, aiming to achieve the average national leakage rate.
13. Some of AW's proposals in their plan to reduce leakage are perverse in their logic. As an example, ***the planned reduction in two of their most important central zone areas is not due to take place until 2043 (ie. after the Abingdon Reservoir would be built)***. This is shown in figure 1. If the leakage reduction in the Lea and Colne sub-zones was implemented earlier, then the construction of Abingdon could be delayed by 6 years on this action alone, allowing better assessment of whether the reservoir was justified. This is a clear demonstration of AW's attempt to justify Abingdon at all costs.

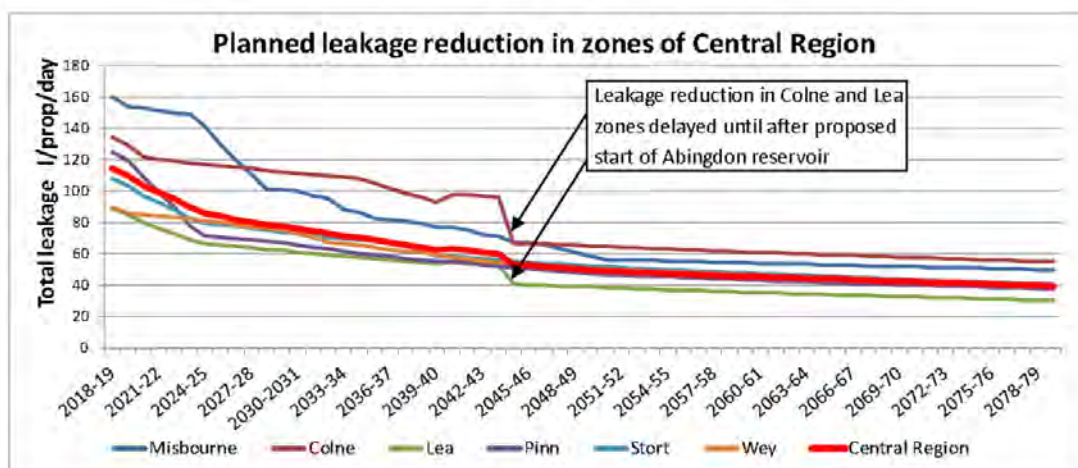


Figure 1: Planned reduction in Leakage in Affinity Water's Central Region (plotted from figures in the rdWRMP supporting tables)



14. Should Affinity achieve a full 50% (or more) leakage reduction in a timely manner, the need for a resource such as Abingdon reservoir would be pushed back many years. Below (para 16) we show how, combined with other measures available to AW, the need for any output from a reservoir could be removed completely.

Reducing Consumption

15. Affinity has placed insufficient priority on measures that could reduce individual consumption toward industry best practice. Its metering rate is below the industry average and it has only managed to increase metering by 3% over the last 4 years – again well behind many other companies. AW’s medium and long-term plans aim for 80% metering by 2025 and 90% by 2045.
16. Some companies, eg. Anglian Water have found that installing ‘smart meters’ reduced usage another 11% beyond the savings achieved by installing dumb meters. Affinity plan to continue installing dumb meters for several years and instead should aim to fit smart meters much sooner. The NIC recommend widespread smart meter installation by 2035, and Anglian Water aims for 95% meter penetration by 2030. Affinity should aim to achieve such targets
17. Affinity is planning for hardly any improvement in individual water usage after 2025, and indeed, as shown in figure 2, some of it zones show a marked *increase* in water usage. Some of the Affinity zones are predicted to rise above even the *present* industry norm of 130 litres per head per day. Affinity should be aiming for the *future* industry planned average of 100-120 litres per head per day. It should be considering the ability of smart meters, the effect of potential water appliance labelling and new house water efficiency to drive its usage down to similar levels as other water companies.

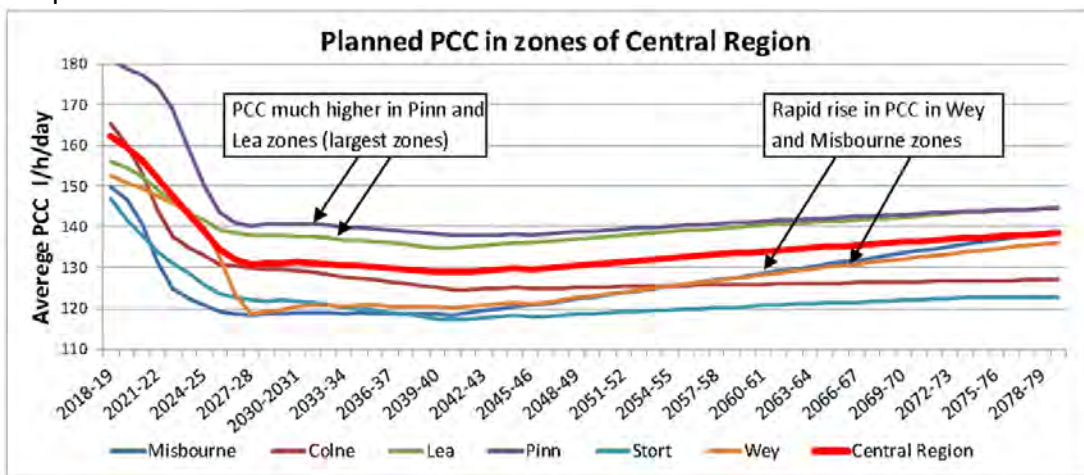


Figure 2: Per capita consumption (PCC) predictions for the Affinity Water zones in the central region (plotted from figures in the rdWRMP supporting tables).

Combined Demand Management measures to remove the need for any major new source

If Affinity adopt 50% Leakage reduction to 2050, and then continue to aim to approach the industry norm to 2080 (as all companies will be reducing leakage); and aim for the middle of the cohort PCC band by 2080; then table 1 shows that, they can



reduce their deficit by 141 Million litres per day, more than the anticipated take from the Abingdon Reservoir.

Measure	GARD proposed demand and leakage plan						
	2020	2025	2035	2045	2050	2060	2080
Aff Population m	3.37	3.63	3.77	4.1	4.22	4.44	4.9
Meter penetration %	56	80	87	89	90	91	95
PCC l/h/day AFF	159	139	130	130	131	134	138
GARD	159	129	126	124	122	119	114
Reduction in demand MI/d	0	36	15	24	38	67	118
Leakage MI/d AFF	148	122	110	91	88	88	88
GARD	<u>148</u>	<u>122</u>	<u>107</u>	<u>84</u>	<u>74</u>	<u>70</u>	<u>65</u>
Leakage reduction	0	0	3	7	14	18	23
Total reduction MI/d	0	36	18	31	52	85	141

Table 1: Proposed combined Demand Management measures to 2080.

A robust and adaptive set of new water sources for Affinity's needs

'Supply 2040' scheme – bring forward

18. Affinity's plan includes the '**Supply 2040**' scheme, allowing more transfer of water from South to North of their Central Region. This is shown in figure 3, adapted from the AW rdWRMP.³ This network is intended by Affinity to service the connection of AW's network to the extra water being extracted from the Thames, coming from the Abingdon reservoir. It is an excellent idea in itself however, and does not need to rely on water from Abingdon reservoir – it can be used to transfer surplus water currently available in Affinity and Thames Water's Thames valley supplies. Later, if needed, it can connect to Thames Water's London zone, as explained later.
19. 'Supply 2040' should be brought forward as much as possible to increase adaptability in the response to any increased demand, allow larger and quicker reductions in chalk stream abstractions and improved ability to manage London supplies.

³ Affinity Water revised draft WRMP, page 10, March 2019.

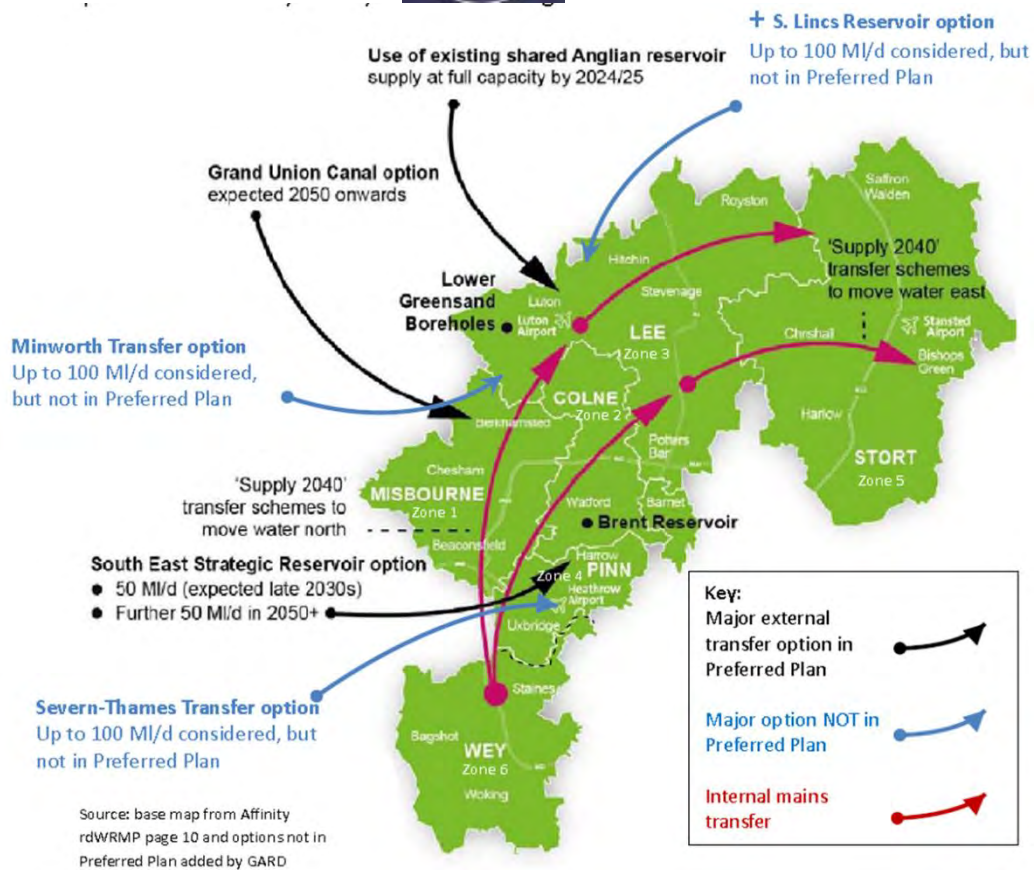


Figure 3: Affinity 'Supply 2040' network (taken from page 10 of the rdWRMP, with additions by GARD). The map shows those strategic supplies in the plan (including Abingdon) and those discarded, including the Severn-Thames transfer and the Minworth Transfer from the Trent.

20. Affinity has surplus water in its southern supply zones that could be used, via 'Supply 2040', to meet shortfalls in the north of its area.
21. A link to Thames Water's London supplies, via 'Supply 2040', would allow much larger reductions to chalk stream abstractions than currently planned, with only a small impact on London's supplies (see para 31 below), because 90% of the water from London would return to London as enhanced chalk stream flows. This would be a much faster and less costly way of relieving chalk streams than waiting for Abingdon reservoir.

Affinity Water's water need and GARD's proposal for non-strategic sources to provide it

22. Figure 4 shows AW's forecast of their need, taken from the figures in the rdWRMP.⁴ It is clear that AW build up a considerable water surplus by their plan to take the two tranches from Abingdon reservoir, and then their second strategic source, the Grand Union Canal transfer.

⁴ These figures are using AW's leakage and PCC forecasts and the population predictions. As stated, none of this is accepted by GARD.



23. It is important to emphasise that this surplus is *in addition to* the margin allowed for extra drought resilience (going to 1 in 200 years resilience against drought), and the normal ‘headroom’ margin built into the predictions. The position could be described as ‘comfortable ++’.
24. Figure 4 shows that, even on Affinity’s own predictions (not accepted by GARD) ***the Abingdon reservoir is not needed until 2051.***

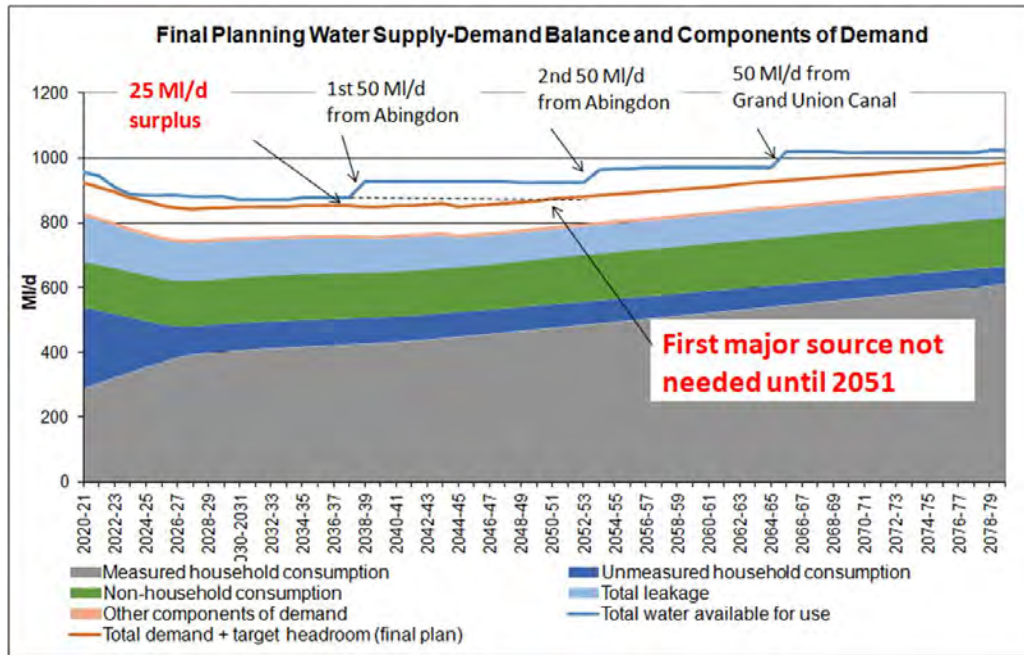


Figure 4: Affinity Water prediction of demand and Water Available for Use

25. AW’s own plan shows that the two most southern zones in the Central region (the Pinn and Wey zones shown in figure 3) are in surplus (without needing Abingdon) until the early 2040s (this is the 25 Million litres per day surplus shown in figure 4).
26. As a **first phase** of GARD’s proposed plan, this surplus should be used in the 2030s, via the early implementation of ‘Supply 2040’ to relieve the northern zone shortages, which would enable more chalk-stream reductions to occur.
27. As a **second phase**, there should be transfer of part of Thames Water’s licence to extract at Sunnymeads on the Thames to AW’s extraction point ‘next door’. This is possible because the TW ‘Slough, Wycombe, Aylesbury’ (SWA) zone, supplied by Sunnymeads, is forecasted by TW’s plan to be in surplus by at least 15 Million litres per day until beyond 2080.⁵ The transfer of 15 Million litres per day from 2051 (as shown in figure 5, would feed into the Supply 2040 network and delay the need for a strategic resource (Abingdon or otherwise) until 2056.

⁵ Thames Water revised dWRMP WRP Excel table “[DryYr_SWA_rdWRMP19 Public.xlsx”, v15, June 2018

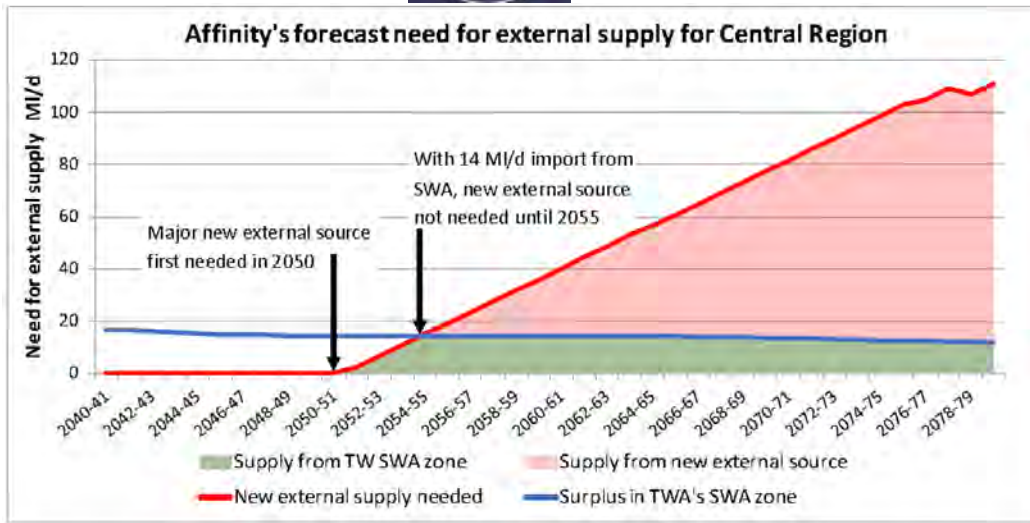


Figure 5: Using part of the TW Slough-Wycombe-Aylesbury (SWA) to satisfy the Central Zone shortfall in the 2050s.

28. As is generally true about 'Thames' water supplied to AW in this way, at least 70% of the water supplied to AW is almost immediately returned as treated effluent to the Rivers Thames and Lea and subsequently reused by Thames Water to supply London. So the 'borrowing' of this licence, still returns water to TW.
29. This generic feature of water supplied to the northern AW Central Zone arises because of the drainage patterns of the AW area streams and rivers. This is shown in the map in Appendix 1. The majority of the AW supplies in this area drain into locations mostly upstream of the TW London supply intakes.
30. This feature enables the **third phase** of GARD's proposal. This involves connecting to the TW Queen Mary reservoir (using pipelines and water treatment works already in the AW plans) and taking up to 100 Million litres per day to transfer into the Supply 2040 network. This is shown in figure 6.

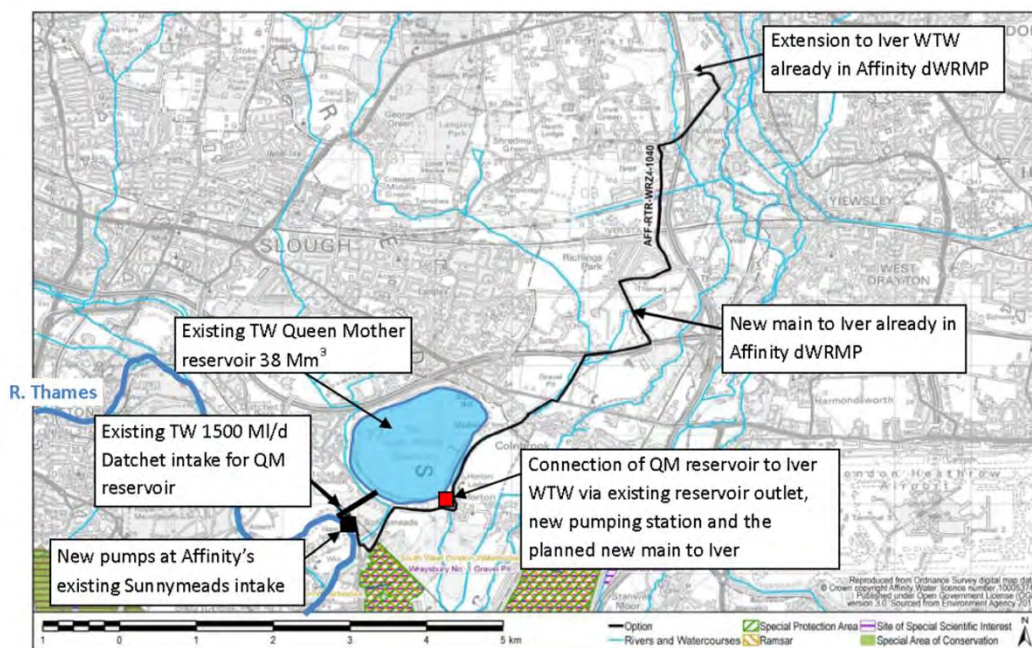




Figure 6: Proposed Affinity connection to TW Queen Mary reservoir

31. GARD's simulations show that about 77% of this supply will be returned to the TW network in the rivers Lea and Thames. The transfer thus has a true 'cost' to London of around 23 Million litres per day.
32. As a by-product, the use of these supplies sent to the northern part of the Central Zone will also allow further augmentation of the chalk-stream flows.
33. The minimal impact on the London TW supplies of this third phase could be easily accommodated by implementing any number of small schemes.⁶ It is also noteworthy that 23 Million litres per day represents less than 3% of the present leak rate from TW's supply network.

Finally, we note that about 70% of the water which would be transferred from Affinity's second favourite strategic scheme (the Grand Union Canal transfer) would be available to the London network via the river network of the Central Area.

Existing Plan is a Bad deal for Affinity Water customers

34. As indicated, about 70% of the water supplied to Affinity is almost immediately returned as treated effluent to the Rivers Thames and Lea and subsequently reused by Thames Water to supply London. With the reservoir option however, ***Affinity customers will be charged 100% of the cost for a net 30% of the water supplied.*** This is a very bad deal for Affinity customers. GARD has proposed several quicker and easier ways for Affinity to increase its water supply using a mix of Thames Water's surpluses and existing London supplies. Since 70% of this could be returned to the Thames upstream of Thames Water extraction points, it would be available for reuse.

⁶ For example the proposal by RWE, the owners of Didcot Power Station, to supply up to 40 Million litres per day of purified water from the Didcot PS.

