

APPENDIX TW-4:

Summary of work to determine the need for a reservoir and identify potential sites

SUMMARY OF WORK TO DETERMINE THE NEED FOR A RESERVOIR AND IDENTIFY POTENTIAL SITES

The purpose of this note is to:

1. Provide an overview of Thames Water's large resource options, including reservoirs, as presented in the Water Resources Management Plan 2014 (WRMP14) and on-going work on these options to inform WRMP19 (section 1); and
2. Summarise the work completed to date to identify and review potential reservoir sites (section 2).

1. Overview of WRMP14 and on-going work to examine large resource options

- 1.1 TW published its final WRMP14 (the plan) in August 2014 following approval from the Secretary of State for Environment, Food and Rural Affairs.
- 1.2 In the London Water Resource Zone (WRZ) there is a significant supply demand deficit over the planning period. In the short-term (2015-2020) the plan focuses on demand management activities, together with inter-company and commercial water transfers, and the development of small scale groundwater resources to meet the supply demand balance. In the longer term there is a need for a large new resource from the mid-2020s, primarily to serve London.
- 1.3 In WRMP14 a range of reservoir options was included in the unconstrained options list, of different sizes and different modes of operation:
 - Directly supplying SWOX (Direct Supply Reservoir, DSR),
 - Regulating river flow for supply in London (River Regulation Reservoir, RRR)
 - A combination of the above to supply both London and SWOX (Dual)
- 1.4 Following a screening process, several reservoir options were rejected as these options were assessed to be less favourable than other reservoir options which were retained and taken forward to the constrained options list. This process was documented and published in WRMP14¹. The reservoir options included in the constrained options list for WRMP14 are as follows:

New Reservoir Storage	Direct Supply	Abingdon	Abingdon 30 Mm3	SWOX
		Longworth	Longworth 30 Mm3	SWOX
	River Regulation and Direct Supply	Abingdon	Abingdon 30 Mm3 2 zone	London/SWOX
			Abingdon 50 Mm3 2 zone	London/SWOX
			Abingdon 100 Mm3 2 zone	London/SWOX
			Abingdon 125 Mm3 2 zone	London/SWOX
			Abingdon 150 Mm3 2 zone	London/SWOX
			Abingdon 75 Mm3 + 75 Mm3 2 zone	London/SWOX
		Chinnor	Chinnor 75 Mm3 2 zone	London/SWOX
			Chinnor 100 Mm3 2 zone	London/SWOX
		Longworth	Longworth 30 Mm3 2 zone	London/SWOX
			Longworth 50 Mm3 2 zone	London/SWOX
	River Regulation Reservoir	Abingdon	Abingdon 30 Mm3	London
			Abingdon 50 Mm3	London
			Abingdon 75 Mm3	London
			Abingdon 100 Mm3	London
			Abingdon 125 Mm3	London
			Abingdon 150 Mm3	London
			Abingdon 75 Mm3+75 Mm3	London
		Chinnor	Chinnor 75 Mm3	London
			Chinnor 100 Mm3	London
		Longworth	Longworth 30 Mm3	London
			Longworth 50 Mm3	London

¹ WRMP14 Section 7, Appendix P (Options List) and Appendix Q (Rejection Register)

- 1.5 WRMP14 proposes wastewater reuse as the preferred large scale resource option to be introduced in 2027. Given the uncertainties with this and other large supply options (reservoirs and raw water transfers), the plan commits Thames Water to a range of investigations to improve confidence in cost, performance and resilience to identify the best value resource option(s) for promotion in WRMP19. The EA and Defra agreed with this strategy.
- 1.6 A four phase programme commenced in June 2014 to progress work on large resource options. Mott MacDonald, working in partnership with Cascade Consulting, have been appointed to undertake Phases 1 and 2. The objectives of Phase 1 included a review of the WRMP14 supply options and development of a transparent and robust approach for reducing the number of options taken forward for more detailed investigation (Phase 2). Figure 1 below explains the process which all supply options (including reservoirs) will be subject to. A briefing paper²³ describes the approach and screening definitions agreed with stakeholders for Phase 1.

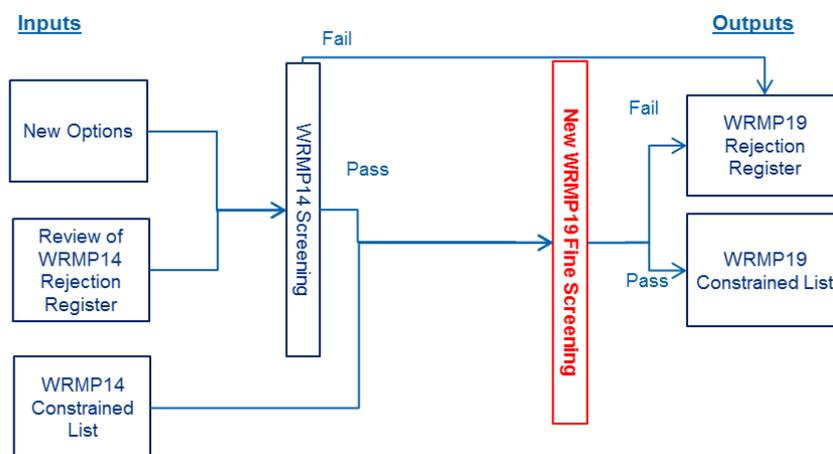


Figure 1: Phase 1 screening process to reduce options for further investigation

- 1.7 As part of the Phase 1 work (referred to in section 1.6), regulators and stakeholders were asked for views on whether any large scale options rejected in WRMP14 needed to be revisited. There were no comments on the rejection of the reservoir sites presented in the WRMP14 Rejection Register⁴.
- 1.8 The Phase 1 work produced a draft WRMP19 fine screening report and identified a programme of investigations required to finalise the fine screening. These investigations are underway as part of the Phase 2 work and an updated draft fine screening report is planned for June 2016, with the final fine screening report and feasible option list due to be produced in June 2017.

2. Reservoir options and site selection work

- 2.1 TW has completed various studies to develop potential reservoir options over several years. The following provides a summary of the relevant work completed on reservoir options and sites specifically.

² Development of large scale water resource options, Option screening report, May 2015

³ Thames Water Briefing paper on water resource options and the assessment of options October 2014

⁴ WRMP14 Appendix Q

2.1.1 Reservoir Site Selection Study 2006

2.2 In 2005 TW commissioned an investigation to identify a preferred site or sites that would be suitable for development of a reservoir in the Upper Thames catchment. The study identified a range of potential reservoir sites, sizes and functions (direct supply, regulating and dual function). It used a pair-wise comparison of sites at each size to select a single preferred site for each size/function scenario. The methodology for the study was developed in consultation with stakeholders and presented in the report. The reservoir site selection study report was published in 2006. It was concluded that the preferred sites for each reservoir size were as follows:

- 30 Mm³ Longworth, Abingdon, Marsh Gibbon, Quainton;
- 50 Mm³ Abingdon (both direct supply and regulation);
- 75 Mm³ Abingdon;
- 100 Mm³ Abingdon;
- 125 Mm³ Abingdon; and
- 150 Mm³ Abingdon.

2.2.1 WRMP09 Public Inquiry

2.3 In 2009 the Secretary of State called a public inquiry to enable further examination of Thames Water's WRMP09. The reservoir Site Selection Study 2006 was included as a reference document in the public inquiry and whilst the report did not receive much consideration, it was also not criticised.

2.3.1 WRMP14 review

2.4 TW commissioned a review of the reservoir site selection study to inform the development of the draft WRMP14. The review was completed by independent consultants, Cascade Consulting and Atkins. The 2006 report was reviewed in respect of a range of environmental criteria and updated with new information such as water availability, reliability of river flows and new developments to ensure the baseline was still relevant and accurate. The planning and environmental aspects of the review concluded that whilst there were some changes to the base information since the original study in 2005, there were no changes to the sites taken forward for further consideration, and that the findings of the 2006 report remain valid.

2.5 At WRMP14 a wider range of options in the 50, 75 and 100 Mm³ sizes were included in the constrained list than identified in the site selection report (see paragraph 1.4 above for full list). This work is documented in WRMP14 Appendix Q, the scheme rejection register. The following conclusions were drawn from the analysis:

- All Direct Supply reservoirs greater than 30 Mm³ were screened out following review of the supply demand balance in SWOX WRZ.
- Marsh Gibbon, Ludgershall and Quainton perform least favourably on environmental criteria compared to Abingdon, Longworth and Chinnor and are therefore screened out from any further analysis on the basis of a combination of overall environmental performance and scheme cost.
- Longworth provides an alternative to Abingdon at 30Mm³.
- Abingdon and Chinnor provide the least cost alternatives at 75 to 100Mm³ volumes, although Chinnor is the more expensive of the two options.
- Abingdon is the only location which can accommodate development at or greater than 100Mm³.

2.6 WRMP19 large scale option development

- 2.7 Further review and screening of reservoir options is being conducted in preparation for WRMP19, building on the WRMP14 work (see paras 1.5 to 1.7 above). As part of the WRMP19 investigations an update of the site selection report (to be included in a feasibility report for this strategic option type) is planned. Similar feasibility reports are being developed for the other supply option types: the same basic format is being adopted across the option types. These reports will inform the updated fine screening reports that are planned for 2016 and 2017 and which will provide the feasible list of options that will be used to develop the proposed water resource development programme to be included in the WRMP19 plan.
- 2.8 The updated reservoir feasibility report will take account of changes to constraints that have taken place, which could impact upon the relative performance of the different reservoir sites. This is needed to confirm the assessment that Abingdon should be the first site for construction of a new reservoir.
- 2.9 Looking ahead to the longer term, a second storage reservoir in Oxfordshire could be built in conjunction with a Severn–Thames Transfer so as to capture and store winter flows transferred from the River Severn. The Chinnor and Longworth sites would be the likely locations for such a reservoir. Both sites came out highly in the WRMP14 site selection report for reservoirs sized between 30Mm³ and 75Mm³. Therefore both sites should be safeguarded.
- 2.10 The WRMP19 will include a view of necessary water resources beyond the 25 years, potentially up to 50 to 100 years, and against a range of scenarios. This work may highlight that more than one strategic resource is required over this longer timeframe. Therefore two reservoirs might be necessary in Oxfordshire in the long term, one for an Upper Thames Storage reservoir and the second as a Severn transfer storage reservoir. This reinforces the need to safeguard all three sites (Abingdon, Chinnor and Longworth).