Draft Water Resources Management Plan 2024

Resource Options - Water Reuse Feasibility Report Addendum

Contents

Tables

Executive summary

1. This report provides a summary of changes that have been made to the water reuse options since Thames Water's 2019 Water Resources Management Plan (WRMP19) as part of the 2024 Water Resources Management Plan (WRMP24) development.

2. This report acts as an addendum to Thames Water WRMP19 Resource Options Water Reuse feasibility report, October 2018, Rev 03.

3. No new reuse options have been identified at WRMP24. A London Effluent Reuse SRO has been identified by Ofwat which includes development of Beckton, Mogden and Mogden South Sewer reuse options through the Gate process. Deephams Reuse has also been further developed in discussion with the Environment Agency (EA).

4. At WRMP24 backchecking of the WRMP19 screening decisions has been undertaken, where appropriate options have been further developed.

5. The updated WRMP24 feasibility assessment presents the WRMP19 options and the further developed WRMP24 options. The findings for the Stage 1 assessments were unchanged from the WRMP19 feasibility assessments. Stage 2 assessment for Deephams Reuse was updated at WRMP24 to reflect discussions with the Environment Agency, the option passed screening when implemented after 2060.

6. The following options are the confirmed list of feasible water reuse options for WRMP24:

    - Beckton Reuse (up to 300 Ml/d)
    - Crossness Reuse (up to 300 Ml/d)
    - Mogden Reuse (up to 200 Ml/d)
    - Mogden South Sewer (up to 50 Ml/d)
    - Deephams Reuse post 2060 (46.5 Ml/d)

7. This report summarises the changes to the reuse options up to the end of feasibility screening. However it should be noted that at WRMP24 Crossness Reuse option was rejected at further screening and is not included on the Constrained List of options for WRMP24. The rejection reasoning can be found in WRMP24 Appendix Q Scheme Rejection Register.

8. Information on option development and further screening can be found in WRMP24 Section 7 - Appraisal of Resource Options.

Introduction

9. Thames Water is developing options for the 2024 Water Resources Management Plan (WRMP24). These options build on options developed as part of Thames Water's 2019 Water Resources Management Plan (WRMP19). This report provides a summary of changes that have been made to the water reuse options since WRMP19 and as part of WRMP24 development.

10. This report acts as an addendum to **Thames Water WRMP19 Resource Options Water Reuse Feasibility Report, October 2018, Rev 03.** This report should be read alongside the WRMP19 report. Information in this report supersedes information provided in the WRMP19 report.

11. Changes to the WRMP19 Water Reuse Options have been detailed in Section 0. A backchecking exercise has been completed to assess if any changes are required to WRMP19 as a result of identification of the new options or developments since WRMP19. Backchecking entails a review of options previously dismissed to see if they require reappraisal in the light of knowledge accumulated since they were dropped from consideration. Backchecking also provides the opportunity to take into account any changes of circumstance that might affect how an option is considered. This might include a change in the planning and environmental status of a site, changes in national and local planning policy and the emergence of viable technical solutions that were unavailable at the time the original assessment was undertaken.

12. The WRMP24 screening, option development and backchecking methodology is detailed in Section 7 - Appraisal of Resource Options.

13. This report summarises changes to the water reuse options up to the end of feasibility screening.

Structure of this report

14. Table 1 summarises the structure of this report.

Table 1: Structure of this report

Section Name	Description
Executive summary	Summary of addendum report
Introduction	This section
Updates since WRMP19	Summary of the changes made to the options list since WRMP19, including changes to WRMP19 options, new WRMP24 options and changes to Deployable Output (DO).
Updated feasibility assessment	Provides a summary of the current feasibility assessment for all options including options identified at both WRMP19 and WRMP24.
Option verification and conclusion	Validation of risk and uncertainty for all options and the confirmation of the feasible list of options.
Appendix A: Reference information	A list of useful links and references
Appendix B: Option references	Table of the options WRMP19 and WRMP24 IDs
Appendix C: Environment Agency Comments	Summary of the comments received from the Environment Agency at WRMP24 in relation to options discussed in this report.
Appendix D: Middle Thames Tideway – Cumulative effects of re-use, desalination and DRA WRMP19 Options	WRMP19 assessment of the impacts of options (water reuse, desalination and direct river abstraction) that decrease the freshwater inputs to the Thames Tideway and the cumulative limit on the total additional capacity of these options.

Updates since WRMP19

Option Identification

To ensure Thames Water is aligned with the WRSE approach, the following updates have been made to option identification for WRMP24:

- The WRMP19 rejection register has been revisited to ensure that the rejection reasoning remains robust for all rejected options.
- Rejected options have been reviewed to identify any options which should be revisited due to potential for regional benefits, particularly in light of changes in requirements to plan for 1:500 drought resilience (previously 1:200 at WRMP19) and the need to plan for a long-term environmental destination that achieves and maintains a sustainable level of abstraction by 2050 (Section 2.2).
- A review has been undertaken to identify new options to be considered in addition to the existing WRMP19 options, this did not identify any new reuse options.

Feasibility Screening Updates

15. The overall changes to options and approach since WRMP19 are described in WRMP Section 7 Appraisal of Resource Options. Specific changes applicable to Water Reuse Options are detailed in Table 2 and Table 3. These tables should be read alongside the WRMP19 feasibility report.

Table 2: Option changes since WRMP19

WRMP19 Option Reference and name	WRSE Option Reference and name	Changes to the Option	WRMP19 Feasibility Screening Outcome	WRMP24 Feasibility Screening Outcome
London				
Deephams Reuse (46.5Ml/d) - RES-RU-DPH Option requires conveyance either through pipeline to River Lee diversion upstream of KGV intake (CON_RU-DPH-KGV) or through connection to Lockwood to KGV tunnel (CON-RU-DPH-TLTEX)	Deephams Reuse – 46.5 Ml/d, to TLT TWU_KGV_HI-REU_RE1_ALL_deephams reuse 46.5b / Deephams Reuse – 46.5 Ml/d, direct to KGV TWU_KGV_HI-REU_RE1_ALL_deephams reuse 46.5	The Environment Agency's representation on Thames Water's revised draft WRMP19 included "Recommendation 2 - Ensure that the Deephams option is feasible and does not pose a risk to the environment". That recommendation outlined, at R2.2, concerns over environmental impacts on downstream habitats from reduced flows from Deephams Sewage Treatment Works (STW); and at R2.3, in the estuarine Thames Tideway. At WRMP19 the Environment Agency required Thames Water to demonstrate that there are no WFD compliance risks with the option, in order for it to progress to detailed design by 2022/23 within AMP7. Further work has been undertaken by Thames Water since publication of WRMP19[1] with extensive collaborative working with the Environment Agency. Following completion of the further studies by Thames Water, joint review[2] of the findings with the Environment Agency has established that a Deephams STW Reuse option is incompatible with the environmental ambition flow targets that the Environment Agency is seeking to deliver for the Lower River Lee through WRSE and the Environment Agency's Environmental Destination work[3]. The option has been included on the Constrained List for implementation after 2060 as it could be considered following delivery of measures under the EA's Environmental Destination work.	Passed Stage 3 and Fine Screening – on Feasible List	The option passed screening and is included on the Feasible List of options for implementation after 2060.
Beckton Reuse (50Ml/d) - RES-RU-BEC-50	TWU_KGV_HI-REU_reuse beckton 50 Beckton Effluent Reuse – 50 Ml/d Treatment	**This is the 50Ml/d phase treatment component of Beckton Reuse** No critical changes. Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19.	Passed Stage 3 – on Feasible List	Passed – included on Feasible List of options as part of the Beckton Reuse option

[1] As reported in: Thames Water (2021) Deephams STW Reuse Option Assessment – Phase 3 WFD Compliance Assessment. Report prepared by Ricardo in associated with Atkins Ltd. Draft issued 15 April 2021

[2] 30 April 2021: Project meeting between Thames Water, Environment Agency, Ricardo, and Atkins Ltd
15 July 2021: Project meeting between Thames Water, Environment Agency, Ricardo, and Atkins Ltd
22 September: Regular strategic meeting between Environment Agency and Thames Water
13 October 2021: Project meeting between Thames Water, Environment Agency, Ricardo, and Atkins Ltd

[3] Joint position between Environment Agency and Thames Water on water environment effects of the Deephams STW Reuse option Mar 2022 v0.5

WRMP19 Option Reference and name	WRSE Option Reference and name	Changes to the Option	WRMP19 Feasibility Screening Outcome	WRMP24 Feasibility Screening Outcome
Beckton Reuse (100Ml/d) - RES-RU-BEC-100	Beckton Effluent Reuse – 100 Ml/d Treatment TWU_KGV_HI-REU_reuse beckton 100	**This is the 100Ml/d phase treatment component of Beckton Reuse** No critical changes. Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19.	Passed Stage 3 – on Feasible List	Passed – included on Feasible List of options as part of the Beckton Reuse option
Beckton Reuse (150Ml/d) - RES-RU-BEC-150	Beckton Effluent Reuse – 150 Ml/d Treatment TWU_KGV_HI-REU_reuse beckton 150	**This is the 150Ml/d phase treatment component of Beckton Reuse** No critical changes. Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19.	Passed Stage 3 – on Feasible List	Passed – included on Feasible List of options as part of the Beckton Reuse option
CON-RU-BEC-LCK-300 Beckton to Lockwood Conveyance	TWU_KGV_HI-TFR_beckton to lockwood Beckton to Lockwood Tunnel Conveyance	**This is the conveyance component of Beckton Reuse** No critical changes. Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19.	Passed Stage 3 – on Feasible List	Passed – included on Feasible List of options as part of the Beckton Reuse option
CON-RWS-LCK-KGV-800 Raw Water System - Lockwood PS to KGV Reservoir Intake	TWU_KGV_HI-TFR_lockwood ps-kgv res TLT extension from Lockwood PS to King George V Reservoir intake	**This is the conveyance component of Beckton Reuse** No critical changes. Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19.	Passed Stage 3 – on Feasible List	Passed – included on Feasible List of options as part of the Beckton Reuse option
n/a	TWU_KGV_HI-TFR_KGV_ALL_beckton tokgv100	**This is an alternative conveyance option for Beckton Reuse** New option for WRMP24 WRMP24 has developed a pipeline conveyance option for up to 100 Ml/d as an alternative to Beckton to Lockwood Tunnel Conveyance and TLT extension from Lockwood PS to King George V Reservoir intake tunnels. This has been back checked against WRMP19 feasibility assessment criteria and screened out on the grounds of cost, engineering constraints and environmental impacts. Note: Letter has been sent to RAPID[4] setting out reasons for screening out this option and RAPID have provided the reply[5].	n/a	Rejected
RES-RU-MOG-50	TWU_WLJ_HI-REU_reuse mogden 50	**This is the 50Ml/d phase treatment component of Mogden Reuse** No critical changes.	Passed Stage 3 – on Feasible List	Passed – included on Feasible List of

[4] https://www.ofwat.gov.uk/wp-content/uploads/2022/05/Thames-Water-letter-to-RAPID-Beckton-pipeline-route-rejection-version2.1.pdf
[5] https://www.ofwat.gov.uk/wp-content/uploads/2022/05/Letter-from-Paul-Hickey-to-Rob-Bromley-20-May_2022.pdf

WRMP19 Option Reference and name	WRSE Option Reference and name	Changes to the Option	WRMP19 Feasibility Screening Outcome	WRMP24 Feasibility Screening Outcome
Reuse: Mogden 50 Ml/d	Mogden Effluent Reuse – Reuse Treatment Plant - 50Ml/d	Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19.		options as part of the Mogden Reuse option
RES-RU-MOG-100 Reuse: Mogden 100 Ml/d	TWU_WLJ_HI-REU_reuse mogden 100 Mogden Effluent Reuse – Reuse Treatment Plant - 100Ml/d	**This is the 100Ml/d phase treatment component of Mogden Reuse** No critical changes. Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19.	Passed Stage 3 – on Feasible List	Passed – included on Feasible List of options as part of the Beckton Reuse option
CON-RU-MOG-WAL-200 Mogden to Walton 200 MLD [6]	TWU_WLJ_HI-TFR_reuse mogden/Walton Mogden to Walton 200 Ml/d - Conveyance for Mogden Effluent Reuse Treatment	**This is the conveyance component of Mogden Reuse** No critical changes. Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19.	Passed Stage 3 – on Feasible List	Passed – included on Feasible List of options as part of the Beckton Reuse option
RES-RU-MSS-50; CON-RU-MSS-WAL-50 Reuse: Mogden South Sewer 50Ml/d	TWU_WLJ_HI-REU_RE1_ALL_reuse mogden s sewer Mogden South Sewer – Reuse Treatment Plant - 50Ml/d output and associated conveyance	**This is both treatment and conveyance for Mogden South Sewer** Dry Weather Flow (DWF) monitoring data was gathered during the London Effluent Reuse SRO Gate 2 stage, which showed DWF values of 33 to 36Ml/d. This is substantially below a DWF of 60 Ml/d required to support a 50Ml/d Mogden South Sewer scheme. As a result, only a smaller deployable output c.25Ml/d is possible; however the option is retained while the additional wastewater benefits of the option are reviewed. Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19.	Passed Stage 3 – on Feasible List	Passed – on list for investment modelling

[6] Further modelling has shown that a maximum capacity of 200 Ml/d has a high risk of breaching Environment Agency guidance but does not risk breaching the Water Framework Directive (WFD) threshold, this option will therefore has a maximum of 150 Ml/d in the Gate 2 Report. Further work will continue to develop an operational philosophy to mitigate this risk this may result in further changes to the maximum capacity. Any changes will be reflected in the final WRMP documents

Table 3 Option DO changes since WRMP19

WRMP19 Option Name	WRMP24 Option Name	WRMP19 DO (Ml/d)		WRMP24 DO (Ml/d)			Difference (Ml/d)		Impact on Feasibility Assessment Scoring (all options Passed Stage 3 at WRMP19)
		Average	Peak	1 in 2 average	1 in 500 average	1 in 500 peak	Average	Peak	
Deephams Reuse (46.5Ml/d) - RES-RU-DPH	TWU_KGV_HI-REU_RE1_ALL_deephams reuse 46.5	45	45	42	42	42	-3	-3	No Impact
	WU_KGV_HI-REU_RE1_ALL_deephams reuse 46.5b /			42	42	42	-3	-3	No Impact
RES-RU-BEC-50	TWU_KGV_HI-REU_reuse beckton 50	49	49	46	46	46	-3	-3	No impact
RES-RU-BEC-100	TWU_KGV_HI-REU_reuse beckton 100	95	95	89	89	89	-6	-6	No impact
RES-RU-BEC-150	TWU_KGV_HI-REU_reuse beckton 150	138	138	130	130	130	-8	-8	No impact
RES-RU-BEC-200	TWU_KGV_HI-REU_reuse beckton 200	183	183	172	172	172	-11	-11	No impact
RES-RU-BEC-300	TWU_KGV_HI-REU_reuse beckton 300	268	268	252	252	252	-16	-16	No impact
RES-RU-BEC-380 [7]	TWU_KGV_HI-REU_reuse beckton 380	336	336	316	316	316	-20	-20	No impact
RES-RU-MOG-50	TWU_WLJ_HI-REU_reuse mogden 50	49	49	46	46	46	-3	-3	No impact
RES-RU-MOG-100	TWU_WLJ_HI-REU_reuse mogden 100	94	94	88	88	88	-6	-6	No impact
	TWU_WLJ_HI-REU_reuse mogden 150	137	137	130	130	130	-7	-7	No impact
RES-RU-MSS-50 CON-RU-MSS-WAL-50	TWU_WLJ_HI-REU_reuse mogden s sewer	49	49	46	46	46	-3	-3	Water Source and Availability changed from Amber to Red Gate 2 assessment led to changes:

[7] A WRMP19 review of cumulative effects of Thames Water WRMP19 options on the receptor environment in the Middle Thames Tideway identified that if there is more than a 15-20% decrease (275-366 Ml/d) in freshwater inputs to the Middle Tideway normal salinity patterns could be substantially affected. The London Effluent Reuse SRO has therefore considered options up to 300 Ml/d, however at WRMP19 a maximum capacity of 380 Ml/d was assessed as feasible for Beckton Reuse. The 380 Ml/d option remains on the Feasible List while further work is ongoing to review the cumulative impact of options on the Middle Tideway salinity. The Middle Thames Tideway – Cumulative effects of re-use, desalination and DRA WRMP19 Options is provided in Appendix D.

WRMP19 Option Name	WRMP24 Option Name	WRMP19 DO (Ml/d)		WRMP24 DO (Ml/d)			Difference (Ml/d)		Impact on Feasibility Assessment Scoring (all options Passed Stage 3 at WRMP19)
		Average	Peak	1 in 2 average	1 in 500 average	1 in 500 peak	Average	Peak	
									Amber to Red for "Water Source and Availability", "AIC (Normalised Costs)" & "Planning Policy Designations". Green to Amber for "Operational Complexity"

DO = Deployable Output

Non SRO option updates

Deephams Reuse

16. The final WRMP19 set out a programme of further research to ensure the option is compliant with the Water Framework Directive (WFD) Regulations before being progressed, (paragraph 11.244 of Section 11 Preferred Plan to confirm the WFD assessment).

17. Following completion of the investigations, joint review of the findings with the Environment Agency has established that a Deephams Sewage Treatment Works (STW) Reuse option has potential environmental risk. As such, after detailed discussion of the findings with the Environment Agency, Thames Water has withdrawn the option as the preferred WRMP19 option and also as a feasible option from future WRMPs in the medium term period until 2060. The option has been included on the Feasible List with an earliest completion date of 2060.

Passed – on Feasible List with the constraint that the scheme cannot be delivered before 2060.

Strategic resource options

18. The following section summarises updates to the SRO Reuse options compared to WRMP19, as noted in Thames Water WRMP19 Resource Options Water Reuse Feasibility Report, October 2018, Rev 03. For full details of the engineering design development and environmental assessment since WRMP19 refer to London Effluent Reuse Gate 2 submission.

19. This section details the outcome of changes to the designs on the feasibility assessments.

Beckton Reuse

20. The design of the Beckton Reuse option has been further developed for WRMP24, as part of London Effluent Reuse SRO, considering phased development in phases of 50, 100 and 150 Ml/d up to the cumulative limit of 300 Ml/d[8]. The design of these options has not materially changed since WRMP19.

21. At WRMP19 the 50 Ml/d Beckton Reuse option was rejected at Fine Screening however it has been included as a phase capacity for WRMP24 to allow flexibility of phased development in investment modelling.

22. The following conveyance elements are required as part of the Beckton Reuse option; they would be constructed with the initial phase and have sufficient capacity for all subsequent phases:

- Beckton to Lockwood tunnel - there are no material changes to the design since WRMP19.

  An alternative pipeline conveyance for up to 100 Ml/d has been considered and screened out on the grounds of cost, engineering constraints and environmental impacts[9,10].

[8] A WRMP19 review of cumulative effects of Thames Water WRMP19 options on the receptor environment in the Middle Thames Tideway identified that if there is more than a 15-20% decrease (275-366 Ml/d) in freshwater inputs to the Middle Tideway normal salinity patterns could be substantially affected. The London Effluent Reuse SRO has therefore considered options up to 300 Ml/d, however at WRMP19 a maximum capacity of 380 Ml/d was assessed as feasible for Beckton Reuse. The 380 Ml/d option remains on the Feasible List while further work is ongoing to review the cumulative impact of options on the Middle Tideway salinity.
[9] Letter from SRO to RAPID https://www.ofwat.gov.uk/wp-content/uploads/2022/05/Thames-Water-letter-to-RAPID-Beckton-pipeline-route-rejection-version2.1.pdf
[10] RAPID response https://www.ofwat.gov.uk/wp-content/uploads/2022/05/Letter-from-Paul-Hickey-to-Rob-Bromley-20-May_2022.pdf

- Thames Lee Tunnel extension – Lockwood Pumping station to King George V reservoir intake - there are no material changes to the design since WRMP19. The tunnel has been designed with a capacity of around 800 Ml/d which is sufficient for 300 Ml/d from the Beckton Reuse and also to transfer the maximum flow from the existing Thames Lee Tunnel. Pumping capacity of 300 Ml/d has been included within the Beckton Reuse option.

Passed – on Feasible List with a maximum capacity of 380 Ml/d.

Mogden Reuse

23. Mogden Reuse was rejected at WRMP19 Fine Screening.

24. The option has been included for further development within the London Effluent Reuse SRO for WRMP24. As part of this further development, modelling of the outfall location has been undertaken to understand the impacts of the discharge on temperature, water quality and aquatic ecology.

25. The design of the Mogden Reuse option has developed phases of 50 and 100 Ml/d for combination up to a maximum capacity of 200 Ml/d.[11] The routes and design of the conveyance elements have also been updated.

26. The following conveyance elements are required as part of the Mogden Reuse option; they would be constructed with the initial phase and have sufficient capacity for all subsequent phases

- Mogden to Walton 200 Ml/d.

Passed – on Feasible List with a maximum capacity of 200 Ml/d

Mogden South Sewer

27. Flow monitoring has been carried out to assess the amount of flow in the sewer available for abstraction and treatment to provide an additional water resource. The results show a dry weather flow (DWF) ranging between 33 to 36 Ml/d which is substantially below a DWF of 60 Ml/d required to support a 50Ml/d option. As a result only a smaller deployable output c.25Ml/d is possible.

28. In advance of the flow monitoring results, the design was developed for a 50 Ml/d option; however the requirements for a smaller option would be similar, although the capacity of the engineering components would be scaled back.[12]

Passed – on Feasible List with a maximum capacity of 50 Ml/d.

Cumulative limits

29. WRMP19 investigations identified that the decrease in freshwater inputs to the Tideway, arising from water reuse, desalination and DRA options, should be limited to no more than 275-366 Ml/d in order to mitigate impacts on potentially sensitive ecological receptors.

[11] Further modelling has shown that a maximum capacity of 200 Ml/d has a high risk of breaching Environment Agency guidance but does not risk breaching the Water Framework Directive (WFD) threshold, this option will therefore has a maximum of 150 Ml/d in the Gate 2 Report. Further work will continue to develop an operational philosophy to mitigate this risk this may result in further changes to the maximum capacity. Any changes will be reflected in the final WRMP documents

[12] Dry Weather Flow (DWF) monitoring data was gathered during the London Effluent Reuse SRO Gate 2 stage, which showed DWF values of 33 to 36Ml/d. This is substantially below a DWF of 60 Ml/d required to support a 50Ml/d Mogden South Sewer scheme. As a result only a smaller deployable output c.25Ml/d is possible; however the option is retained while the additional wastewater benefits of the option are reviewed.

30. A cumulative limit on the total additional capacity of water reuse and desalination options, that decrease in freshwater inputs to the Tideway, of 366 Ml/d has therefore been included in the WRSE regional modelling. Beckton Reuse, Crossness Reuse and Deephams Reuse capacity are included within this cumulative limit.

31. Further investigation at WRMP24 is ongoing and any updates will be included in the Final WRMP24.

Updated Feasibility Assessment

Feasibility Assessment Approach

32. This section of the report outlines the updates made in WRMP24 to the WRMP19 feasibility assessment. This should be read alongside the WRMP19 Water Reuse Feasibility Report. Where options have been rejected through the screening process the rejection reason is recorded in WRMP24 Appendix Q Scheme Rejection Register .

33. A three-stage feasibility screening approach was employed at WRMP24 and this approach is unchanged from WRMP19, details of the approach can be found in the WRMP19 Water Reuse Feasibility Report.

34. The WRMP19 Water Reuse Feasibility Report Stage 1 identified 13 water reuse option locations for further assessment. Of these 13 locations, five are considered feasible following the Stage 2 and Stage 3 assessment:

- Beckton STW
- Crossness STW
- Deephams STW
- Mogden STW
- Mogden South Sewer

35. At WRMP19, fine screening was undertaken for all options which passed the feasibility screening. The WRMP19 fine screening took account of the estimated volume of predicted water resources deficit of Thames Water and, where applicable, neighbouring companies. However, the predicted water resources need for the region at WRMP24[13] is significantly higher than at WRMP19, owing to:

- increased sustainability reductions
- a change to planning for water supply resilience for a 1 in 500 year drought from 1 in 200 at WRMP19[14]

36. Furthermore, potential new transfers identified by WRSE would allow new resource options in the Thames Water supply area to supply more of the WRSE region than was considered at WRMP19. For these reasons, the potential resource need is not being used as a consideration in the screening process at WRMP24. This is to avoid rejecting options based on Thames Water's need where there could be a regional benefit. At WRMP24 the fine screening stage has therefore been replaced by use of the WRSE investment model to compare options against cost, environmental, and resilience criteria.

37. As a result of the above review one reuse option that was rejected at WRMP19 have been reassessed and included on the WRMP24 Feasible List:

- Mogden Reuse

[13] https://wrse.uk.engagementhq.com/the-challenge
[14] A 1 in 500 year event explained: This does not refer to an event that will occur every 500 years, it is better considered an event where there is a 1 in 500 chance of the event occurring in a given year, or a 0.2% chance. The probability of it happening in one year remains the same in each of the following years.

38. Appendix 0 provides a list of the WRMP19 and WRSE option identification numbers (IDs). These can be used to cross reference options to WRSE lists and WRMP19 documentation.

Stage 1 Assessment Results

39. At WRMP19 all 350 Thames Water owned wastewater catchments were reviewed at Stage 1 to identify appropriate sites for final effluent reuse from STW and where suitable abstraction of raw sewage from wastewater catchments.

40. The Stage 1 assessment used the key constraints (as defined in WRMP19 Water Reuse Feasibility Report, Section 3.2), to focus on STW catchments, where:

- current treated effluent discharges are into a stretch of river where reuse of the water would not impact on downstream abstractors,
- discharges which would otherwise be lost in the tidal reach of the River Thames (Thames Tideway), and
- where catchments can supply the London WRZ.

41. Six STW catchments passed the Stage 1 assessment (as shown in Table 4).

42. No new sites have been identified at WRMP24 and the Stage 1 assessment remains unchanged. Full methodology for Phase 1 assessment is detailed in Section 4 of the WRMP19 Feasibility Report, with the full list of assessed sites detailed in Appendix A of the report.

Table 4: Sites which passed stage 1 assessment

Option / STW catchments	No potential impact on downstream abstractors	No national or international nature conservation designation	No national or international heritage designation	Will the site provide water to London?	Compatible with Thames Water's reuse policy	Result
Beckton	✓	✓	✓	✓	✓	PASS
Mogden	✓	✓	✓	✓	✓	PASS
Crossness	✓	✓	✓	✓	✓	PASS
Deephams	✓	✓	✓	✓	✓	PASS
Long Reach	✓	✓	✓	✓	✓	PASS
Riverside	✓	✓	✓	✓	✓	PASS

Key changes to WRMP19 decisions

43. There are no changes from the WRMP19 assessment at the Stage 1 Assessment.

Stage 2 assessment results

44. The WRMP19 Feasibility Report identified options within the STW catchments at Stage 2 based on:

- The "reliable" source yield from the location within the catchment (generally the STW final effluent or a sewer mining location) and a corresponding expected option capacity taking into account the treatment losses.
- The treatment technology
- The location of the option discharge into a raw water body
- The location of land available for treatment

45. The Stage 2 assessment of the WRMP19 and WRMP24 options that passed Stage 1 is presented in Table 6 providing the red, amber, green assessment of the criteria described in the WRMP19 Water Reuse Feasibility Report.

46. Sixteen options passed the Stage 2 assessment at WRMP19. Further details are included in the WRMP19 Water Reuse Report.

47. Where changes have been made to WRMP19 RAG status they are identified in Table 5. The RAG assessment of SRO options below has not been reviewed at WRMP24, namely:

- Beckton Reuse
- Mogden Reuse

48. The RAG assessment for SRO option Mogden South Sewer has been revisited as part of backchecking (Section 4).

Table 5 Changes to WRMP19 RAG status – Stage 2 assessment

Option	Criteria	WRMP19	WRMP24	Reason for change
Deephams Reuse	Impacts on water resources & quality			Joint position statement has identified that the flow reduction associated with this option is contrary to the environmental ambition for waterbodies downstream of the option. The option is likely to cause major adverse impacts including a high risk to Water Framework Directive objectives

Table 6: Stage 2 assessment of all options

Criteria	Beckton STW (Beckton STW) 300 +	Beckton STW (Beckton STW) 100-299	Beckton STW (Beckton STW) <100	Beckton mining - Abbey Mills (Luxborough Lane) 300	Beckton mining - Abbey Mills (Luxborough Lane) 100-299	Beckton mining - Abbey Mills (Luxborough Lane) <100	Beckton mining - Abbey Mills (Lower Hall) 300	Beckton mining Abbey Mills (Lower Hall) 100-299	Beckton mining - Abbey Mills (Lower Hall) <100	Crossness STW (Crossness Southern Marshes) 100 - 199	Crossness STW (Crossness Southern Marshes) <100	Crossness mining - Greenwich (Lower Hall) 100 -150	Crossness mining - Greenwich (Lower Hall) < 100	Crossness mining - Greenwich (Hogsmill) 100 -150	Crossness mining - Greenwich (Hogsmill) <100	Crossness mining – Millbrook (Hogsmill) 100 – 150	Crossness mining -Millbrook (Hogsmill) <100	Crossness mining –Wandle Valley PS (Hogsmill) <50	Mogden STW (Mogden STW) - 212	Mogden STW 100 - 200	Mogden STW <100	Mogden South Sewer 50	Deephams STW post 2060 (Deephams STW) 25- 46.5	Long Reach STW (within and adjacent to STW site) 50-90Ml/d	Riverside STW (within STW site) 38Ml/d
Property & legal																									
Sufficient TW owned land																									
Space for future growth & changes																									
Land acquisition costs																									
Planning & environmental																									
Land use & quality																									
Floodplain encroachment																									
Landscape designations																									
Visually sensitive viewpoints																									
Nature conservation and biodiversity																									
Archaeology and heritage assets																									
Non-traffic impacts on construction																									
Impacts of construction on traffic																									
Impacts on recreational sites or PRoW																									
Impacts on water resources & quality																									
Engineering																									
Network reinforcements																									
Length of conveyance																									
Pumping head																									
Water resource & availability																									
Suitable access for construction / operation																									
Connectivity for waste streams																									
Construction complexity																									
Operational complexity																									
Option taken through to Stage 3	**Yes**	**Yes**	**Yes**	No	No	No	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No	No	No	No	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No	No

Notes:

a) Title includes the catchment / STW source and in brackets the location of the reuse treatment.

b) Where a criterion relates to two or more sites, the least favourable basis of assessment is shown (i.e. if one site is amber and another site red, then red will be shown).

c) Land and Legal criteria relate to pump station / treatment site location

d) The RAG assessment for SRO options had not been reviewed at WRM24

.

49. Nine options were rejected at Stage 2; the reasons for the option rejection are included in the WRMP24 Appendix Q - Scheme Rejection Register.

50. There are no changes to the WRMP19 Stage 2 feasibility assessment outcomes and the following options were therefore taken forward to Stage 3:

- Beckton Catchment - Beckton STW to site within treatment works boundary 380, 300, 200, 150, 100, 50 Ml/d
- Beckton mining - Abbey Mills to Lower Hall 300, 200, 150, 100, 50 Ml/d
- Crossness Catchment – Crossness STW to site within STW boundary 190,150,100, 50Ml/d
- Crossness Catchment – Millbrook Road SPS to site at Hogsmill STW 100, 50 Ml/d
- Crossness Catchment – Wandle Valley SPS to site at Hogsmill STW 17 Ml/d
- Mogden Catchment – Mogden STW to Site within Mogden STW 212 Ml/d
- Mogden Catchment – Mogden STW to site near Kempton 200,150,100, 50 Ml/d
- Mogden Catchment – Mogden South Sewer to site near Kempton 50 Ml/d
- Deephams Catchment – Deephams STW to site within the STW boundary 46.5 Ml/d.

Key changes to WRMP19 RAG assessment

Deephams STW (Deephams)

51. The "Impacts on water resources & quality" criteria have been reassessed from Amber to Red. However the option has still progressed to Stage 3 on the assumption that it could be implemented post 2060.

52. Further information regarding the investigations into the options is included in the WRMP19 Water Reuse Feasibility report and London Effluent Reuse SRO Gate 2 documents.

Stage 3 assessment results

53. Assessment against Stage 3 criteria of options has been undertaken for all options that passed Stage 2.

54. The Stage 3 assessment of the WRMP19 and WRMP24 options that passed Stage 2 is presented in **Error! Reference source not found.** providing the red, amber, green assessment of the criteria d escribed in WRMP19 Water Reuse Feasibility report. Four options passed the Stage 3 assessment. Further details are included in the WRMP19 Water Reuse Feasibility report and SRO Gate documents.

55. Where changes have been made to WRMP19 RAG status this is indicated in Table 7.

Table 7 Changes to WRMP19 RAG status – stage 3 assessment

Option	Criteria	WRMP19	WRMP24	Reason for change
Deephams Reuse	Nature conservation and biodiversity			Joint position statement has identified that the option has potential environmental risk.
	Water resources & water quality			Joint position statement has identified that the flow reduction associated with this option is contrary to

				the environmental ambition for waterbodies downstream of the option.

Table 8: Stage 3 assessment

Criteria	Beckton STW (Beckton) 300 +	Beckton STW (Beckton) 100-299	Beckton STW (Beckton) <100	Beckton SM - AM (LH) 300	Beckton SM -AM (LH) 100-299	Beckton SM – AM (LH) <100	Crossness STW (Southern Marshes) 100-299	Crossness STW (Southern Marshes) <100	Crossness SM – Millbrook (HM) 100 – 150	Crossness SM -Millbrook (HM) < 100	Crossness SM –Wandle Valley PS (HM) < 50	Mogden STW (Mogden) 212	Mogden STW (HF) 100 - 200	Mogden STW (HF) <100	Mogden South Sewer (HF) 50*	Deephams STW post 2060 (Deephams) 46.5
Property & legal																
Assessment of ownership and tenancy																
Planning, socio-economic & environmental																
Planning policy designations.																
Land take and land quality																
Floodplain encroachment																
Landscape character sensitivity																
Visual sensitivity																
Employment & local economy																
Nature conservation & biodiversity																
Opportunity for biodiversity enhancement																
Heritage assets																
Non-traffic construction impacts																
Impact on recreation																
Water resources & water quality																
Engineering																
Length of conveyance																
Normalised Cost / AIC																
Water source & availability																
Water treatment risks and complexity																
Power supply																
Construction Complexity																
The option included in the feasible list	**Yes**	**Yes**	**Yes**	No	No	No	**Yes**	**Yes**	No	No	No	No	**Yes**	**Yes**	**Yes**	**Yes**

Location Abbreviations: STW sewage treatment works, SM sewer mining, LH lower Hall, HM Hogsmill sewage treatment works.
* required to support a 50Ml/d Mogden South Sewer scheme. As a result only a smaller deployable output c.25Ml/d is possible; however the option is retained while the additional wastewater benefits of the option are reviewed
The RAG assessment for SRO options had not been reviewed at WRM24.

56. There are no changes to the WRMP19 Stage 3 feasibility assessment outcomes; nine options passed the Stage 3 assessment and seven failed the Stage 3 assessment.

57. Further information regarding the investigations into the options is included in the WRMP19 Water Reuse Feasibility report and SRO Gate documents.

58. The following list of options passed Stage 3 feasibility assessment and were taken forward for further consideration:

- Beckton Catchment - Beckton STW to site within STW boundary up to 380 Ml/d[15]
- Crossness Catchment – Crossness STW to the Southern Marshes site up to 190 Ml/d
- Mogden Catchment – Mogden STW to site near Kempton WTW up to 200 Ml/d[16]
- Mogden Catchment – Mogden South Sewer to site near Kempton up to 50 Ml/d[17]
- Deephams Catchment – Deephams STW to site within the STW boundary 46.5 Ml/d (post 2060)

[15] A WRMP19 review of cumulative effects of Thames Water WRMP19 options on the receptor environment in the Middle Thames Tideway identified that if there is more than a 15-20% decrease (275-366 Ml/d) in freshwater inputs to the Middle Tideway normal salinity patterns could be substantially affected. The London Effluent Reuse SRO has therefore considered options up to 300 Ml/d, however at WRMP19 a maximum capacity of 380 Ml/d was assessed as feasible for Beckton Reuse. The 380 Ml/d option remains on the Feasible List while further work is ongoing to review the cumulative impact of options on the Middle Tideway salinity.
[16] Further modelling has shown that a maximum capacity of 200 Ml/d has a high risk of breaching Environment Agency guidance but does not risk breaching the Water Framework Directive (WFD) threshold, this option therefore has a maximum of 150 Ml/d in the Gate 2 Report. Further work will continue to develop an operational philosophy to mitigate this risk this may result in further changes to the maximum capacity. Any changes will be reflected in the final WRMP documents.
[17] Dry Weather Flow (DWF) monitoring data was gathered during the London Effluent Reuse SRO Gate 2 stage, which showed DWF values of 33 to 36Ml/d. This is substantially below a DWF of 60 Ml/d required to support a 50Ml/d Mogden South Sewer scheme. As a result only a smaller deployable output c.25Ml/d is possible; however the option is retained while the additional wastewater benefits of the option are reviewed.

Option Verification and Conclusion

59. The validation discussion of risk and uncertainty in Section 7 of the WRMP19 Water Reuse Feasibility report remains unchanged. Where options have been rejected through the screening process the rejection reason is recorded in Appendix Q rejection register.

Confirmation of feasible list of options:

60. The following list of options are the confirmed list of feasible reuse options for WRMP24:

- Beckton Catchment - Beckton STW to site within STW boundary up to 380 Ml/d[18]
- Crossness Catchment – Crossness STW to the Southern Marshes site up to 190 Ml/d
- Mogden Catchment – Mogden STW to site near Kempton WTW up to 200 Ml/d[19]
- Mogden Catchment – Mogden South Sewer to site near Kempton up to 50 Ml/d
- Deephams Catchment – Deephams STW to site within the STW boundary 46.5 Ml/d (post 2060)

61. This report summarises changes to the reuse options up to the end of feasibility screening. However it should be noted that at WRMP24 Crossness Reuse was rejected at further screening and is not included on the Constrained List of options for WRMP24. The rejection reasoning can be found in WRMP24 Appendix Q Scheme Rejection Register and details of the Further Screening Process can be found in WRMP24 Section 7 – Appraisal of Resource options.

62. Following the backchecking of the WRMP19 feasibility assessment for WRMP24, flow monitoring undertaken by the London Effluent Reuse SRO showed that the Dry Weather Flow (DWF) in the Mogden South Sewer is substantially below a DWF of 60 Ml/d required to support a 50Ml/d Mogden South Sewer option. As a result, only a smaller deployable output c.25Ml/d is possible. The RAG assessment of this option has been backchecked and the changes made to WRMP19 RAG status are indicated in Table 9 and Table 10.

Table 9 Changes to WRMP19 RAG status – Stage 2 assessment

Option	Criteria	WRMP19	WRMP24	Reason for change
Mogden South Sewer	Operational Complexity			Further review by the SR has concluded that the operation is of average complexity, but with relatively complex processes/ operations and requirement for relatively substantial O&M procedures. The Stage 2 assessment of Operational Complexity has therefore been changed to Amber.

[18] A WRMP19 review of cumulative effects of Thames Water WRMP19 options on the receptor environment in the Middle Thames Tideway identified that if there is more than a 15-20% decrease (275-366 Ml/d) in freshwater inputs to the Middle Tideway normal salinity patterns could be substantially affected. The London Effluent Reuse SRO has therefore considered options up to 300 Ml/d, however at WRMP19 a maximum capacity of 380 Ml/d was assessed as feasible for Beckton Reuse. The 380 Ml/d option remains on the Feasible List while further work is ongoing to review the cumulative impact of options on the Middle Tideway salinity.

[19] Further modelling has shown that a maximum capacity of 200 Ml/d has a high risk of breaching Environment Agency guidance but does not risk breaching the Water Framework Directive (WFD) threshold, this option therefore has a maximum of 150 Ml/d in the Gate 2 Report. Further work will continue to develop an operational philosophy to mitigate this risk this may result in further changes to the maximum capacity. Any changes will be reflected in the final WRMP documents.

Table 10 Changes to WRMP19 RAG status – stage 3 assessment

Option	Criteria	WRMP19	WRMP24	Reason for change
Mogden South Sewer	Water Source and Availability			The source flow monitoring results show only c33 Ml/d DWF available blackwater source compared to a required abstraction volume of c60 Ml/d assessed at Gate 1. The source flow is therefore insufficient for a 50 Ml/d option. Stage 3 assessment of Water Source and Availability has therefore been changed to Red as there are significant constraints on the water availability.
	Normalised cost			AIC £/m^3 assessment for Gate 1 gave Normalised Costs between £1.17 and £1.49 per m^3 which under the basis for assessment is an Amber status; "£1.00/m^3 to £1.50/m^3 ". The Gate 2 assessment demonstrates likelihood of increased costs Stage 3 assessment of Normalised cost has therefore been changed to Red (>£1.50/m^3)
	Planning, socio-economic and environmental			Gate 2 assessment has shown that there are a number of emerging issues around loss of woodland, proximity to the SPA and green belt status which makes the site element of the scheme (i.e. the potential site for STW/AWRP) more difficult to develop than assessed at WRMP19. Stage 3 assessment of Planning, socio-economic and environmental has therefore been changed to Red.

63. Mogden South Sewer has been retained as a WRMP24 option while the additional wastewater benefits of the option are reviewed.

64. Information on option development and investment modelling can be found in WRMP24 Section 7 - Appraisal of Resource Options.

Appendix A Reference information

The draft WRMP24 and Technical Appendices can be found on the Thames Water website at:

Please contact consultation@thames-wrmp.co.uk for access to WRMP19 reports

Water resources | Regulation | About us | Thames Water

Please contact consultation@thames-wrmp.co.uk for access to WRMP19 reports

SRO documents referenced in report can be found on the Thames Water website at:

Regional water resources | Regulation | About us | Thames Water

Appendix B Option references

Table 11: Option WRMP19 and WRSE IDs

	WRMP 19 ID	WRSE ID
Beckton Effluent Reuse – 150 Ml/d Treatment	RES-DES-BEC-150;	TWU_KGV_HI-REU_reuse beckton 150
Beckton Effluent Reuse – 100 Ml/d Treatment	RES-RU-BEC-100	TWU_KGV_HI-REU_reuse beckton 100
Beckton Effluent Reuse – 50 Ml/d Treatment	RES-RU-BEC-50	TWU_KGV_HI-REU_reuse beckton 50
Beckton Effluent Reuse – TLT extension from Lockwood PS to King George V Reservoir intake	CON-RU-BEC-LCK-300	TWU_KGV_HI-TFR_beckton to lockwood
Beckton Effluent Reuse – Beckton to Lockwood Tunnel Conveyance	CON-RWS-LCK-KGV-800	TWU_KGV_HI-TFR_lockwood ps-kgv res
Beckton mining - Abbey Mills (Luxborough Lane) 300	See note	TWU_LON_HI-REU_ALL_ALL_abbeymillspslux300
Beckton mining - Abbey Mills (Luxborough Lane) 100-299	See note	TWU_LON_HI-REU_ALL_ALL_abbeymillspslux200 TWU_LON_HI-REU_ALL_ALL_abbeymillspslux150 TWU_LON_HI-REU_ALL_ALL_abbeymillspslux100
Beckton mining - Abbey Mills (Luxborough Lane) <100	See note	TWU_LON_HI-REU_ALL_ALL_abbeymills pslux50
Beckton mining - Abbey Mills (Lower Hall) 300	See note	TWU_LON_HI-REU_ALL_ALL_abbeymillspslh300
Beckton mining Abbey Mills (Lower Hall) 100-299	See note	TWU_LON_HI-REU_ALL_ALL_abbeymillspslh200 TWU_LON_HI-REU_ALL_ALL_abbeymillspslh150 TWU_LON_HI-REU_ALL_ALL_abbeymillspslh100
Beckton mining - Abbey Mills (Lower Hall) <100	See note	TWU_LON_HI-REU_ALL_ALL_abbeymillspslh50
Crossness STW (Crossness Southern Marshes) 100 - 199	See note	TWU_LON_HI-DES_RE1_ALL_crossness(erith) 300 TWU_LON_HI-DES_RE1_ALL_crossness(erith) 150
Crossness STW (Crossness Southern Marshes) <100	See note	
Crossness mining - Greenwich (Lower Hall) 100 -150	See note	TWU_LON_HI-REU_ALL_ALL_greenwichpslh150 TWU_LON_HI-REU_ALL_ALL_greenwichpslh100 TWU_LON_HI-REU_ALL_ALL_greenwichpslh50
Crossness mining - Greenwich (Lower Hall) < 100	See note	
Crossness mining - Greenwich (Hogsmill) 100 -150	See note	TWU_LON_HI-REU_ALL_ALL_greenwichpshogs150 TWU_LON_HI-REU_ALL_ALL_greenwichpshogs100
Crossness mining - Greenwich (Hogsmill) <100	See note	TWU_LON_HI-REU_ALL_ALL_greenwichpshogs50
Crossness mining – Millbrook (Hogsmill) 100 – 150	See note	TWU_LON_HI-REU_ALL_ALL_millbrookpshogs100
Crossness mining -Millbrook (Hogsmill) <100	See note	TWU_LON_HI-REU_ALL_ALL_millbrookpshogs50
Crossness mining –Wandle Valley PS (Hogsmill) <50	See note	TWU_LON_HI-REU_RE1_ALL_wandlepshogs17
Mogden Effluent Reuse (Mogden STW) - 212	See note	TWU_LON_HI-REU_RE1_ALL_mogdeneffru-stw
Mogden Effluent Reuse – Reuse Treatment Plant - 100Ml/d	RES-RU-MOG-100	TWU_WLJ_HI-REU_reuse mogden 100 TWU_WLJ_HI-REU_RE2_ALL_reuse mogden 100 p2

	WRMP 19 ID	WRSE ID
Mogden Effluent Reuse – Reuse Treatment Plant - 50Ml/d	RES-RU-MOG-50	TWU_WLJ_HI-REU_RE1_CNO_reuse mogden 50 TWU_WLJ_HI-REU_RE2_ALL_reuse mogden 50 p2
Mogden to Walton 200 Ml/d - Conveyance for Mogden Effluent Reuse Treatment	CON-RU-MOG-WAL-200	TWU_WLJ_HI-TFR_reuse mogden/Walton
Mogden South Sewer – Reuse Treatment Plant - 50Ml/d output	RES-RU-MSS-50;	TWU_WLJ_HI-REU_RE1_ALL_reuse mogden s sewer
Mogden South Sewer associated conveyance	CON-RU-MSS-WAL-50	
Deephams STW post 2060 (Deephams STW) 46.5 Ml/d	RES-RU-DPH and either CON_RU-DPH-KGV; or CON-RU-DPH-TLTEX	TWU_KGV_HI-REU_RE1_ALL_deephams reuse 46.5
Deephams STW post 2060 (Deephams STW) 25 Ml/d	See note	TWU_LON_HI-REU_RE1_ALL_deephams reuse 25
Long Reach STW (within and adjacent to STW site) 50-90Ml/d	See note	TWU_LON_HI-REU_RE1_ALL_lrstweffluentreuse80 TWU_LON_HI-REU_RE1_ALL_lrstweffluentreuse50
Riverside STW (within STW site) 38Ml/d	See note	TWU_LON_HI-REU_RE1_ALL_riversideeff.reuse38

NOTE: Note - Options rejected prior to constrained list were not all assigned a WRMP19 ID

Appendix C Environment Agency Comments

Table 12: Environment Agency Engagement

Source	Option description	Environment Agency comments	Date of response	Outcome of option screening
Joint position between Environment Agency and Thames Water on water environment effects of the Deephams STW Reuse option Mar 2022 v0.5	Deephams Reuse	Environmental ambition scenarios for the South East to redress these deficits. The flow reduction associated with a Deephams STW Reuse Option is therefore contrary to the environmental ambition for these waterbodies as laid out by the Environment Agency Waterbody Assessment Tool (2021) and adopted by WRSE, if the scheme were implemented before 2060, after which schemes such as Beckton Reuse will be able to provide compensatory flows. No further work on the environmental risks of a Deephams STW Reuse option before this point, or work to identify bespoke mitigation of the risks, will satisfactorily resolve the risk in the absence of a compensatory scheme.	March 2022	As the option is not viable prior to 2060, it has been appraised for a post 2060 introduction

Appendix D Middle Thames Tideway – Cumulative effects of re-use, desalination and DRA WRMP19 Options


Thames
Water