



Revised Draft Water Resources Management Plan 2024

Resource Options – Direct River
Abstraction Feasibility Report



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Executive Summary

1. This report provides a summary of changes that have been made to the Direct River Abstraction (DRA) 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 Direct River Abstraction Feasibility report, September 2018, Rev 05**.
3. The options under WRMP19 have been reviewed and changes have been incorporated accordingly (refer to Section 7 for information on the WRMP screening process)
4. Teddington DRA option, which was rejected during the validation stage at WRMP19, has been re-evaluated, further information on this option and the further design completed can be found in the Strategic Resource Options London Recycling Gate 2 report. Compared to WRMP19 smaller capacity sizes are being considered for this option to address environmental and navigational concerns that were highlighted during WRMP19 feasibility assessment.
5. Lower River Lee DRA option was also reconsidered, however due to the current abstraction pressures on the river the review with EA determined that the option will only add to the pressure and hence the option is not considered to be feasible before 2060 by which time it is considered possible that innovations in technology may make this option feasible (refer to Appendix A).
6. Backchecking of the WRMP19 screening decisions has been undertaken for WRMP24 and where appropriate options have been further developed (refer to Section 7 and Appendix P, Q and R for further information).
7. The updated WRMP24 feasibility assessment presents the WRMP19 options and the WRMP24 options. The findings for Stage 1, Stage 2 and Stage 3 Assessments were unchanged from the WRMP19 feasibility assessments.
8. The following list of options are the confirmed list of feasible DRA options:
 - Teddington DRA (up to 75 MI/d)
 - River Lee DRA
9. It should be noted that River Lee DRA is mutually exclusive with Deephams Reuse. At WRMP19 River Lee DRA was rejected following fine screening as Deephams Reuse was found to be the preferred option. This was backchecked at WRMP24. Deephams Reuse was again found to be the preferred option and River Lee DRA was rejected as a result at Further Screening. Neither Deephams Reuse nor Lower Lee DRA can be delivered before 2060, this does not change the screening decision. For further details on rejection reasoning refer to WRMP24 Appendix Q – Rejection Register.



Introduction

10. 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 Direct River Abstraction options since WRMP19 and as part of WRMP24 development.
11. This report acts as an addendum to **Thames Water WRMP19 Resource Options Direct River Abstraction Feasibility report, September 2018, Rev 05**. This report should be read alongside the WRMP19 report. Information in this report supersedes information provided in the WRMP19 report.
12. Changes to the WRMP19 Direct River Abstraction Options have been detailed in Section 2 - Updates since WRMP19. A backchecking exercise has been completed to assess if any changes are required to WRMP19 decisions as a result of identification of the new options or option development since WRMP19. 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.
13. The WRMP24 screening, option development and backchecking methodology is detailed in Section 7 - Appraisal of Resource Options.
14. This report summarises changes to the Direct River Abstraction options up to the end of feasibility backchecking and screening. Information on option development and investment modelling can be found in WRMP24 Section 7 - Appraisal of Resource Options.
15. London Effluent Reuse was identified by Ofwat as a strategic regional water resource solution (SRO) in the PR19 final determination¹. SROs are being developed through a gated process overseen by the Regulators' Alliance for Progressing Infrastructure Development (RAPID). Although Teddington DRA is not an effluent reuse option, it is reliant on effluent from Mogden Sewage Treatment Works (STW) and has therefore been considered as one of the SRO options.

¹ <https://www.ofwat.gov.uk/publication/pr19-final-determinations-strategic-regional-water-resource-solutions-appendix/>



Structure of this report

17. Table 1 summarises the structure of this report.

| Section | Name | Description |
|---------|------------------------------------|--|
| | Executive summary | Summary of addendum report |
| 1 | Introduction | This section |
| 2 | Updates since WRMP19 | Summary of the changes made to the options list since WRMP19, including changes to WRMP19 options, new WRMP24 phasing options and changes to Deployable Output (DO). |
| 3 | Updated feasibility assessment | Provides a summary of the current feasibility assessment for all options including options identified at both WRMP19 and WRMP24. |
| 4 | Option verification and Conclusion | Validation of risk and uncertainty for all options and the confirmation of the feasible list of options. |
| 5 | Reference information | A list of useful links and references |

Table 1: Structure of this report

Updates since WRMP19

Option Identification

18. To ensure Thames Water is aligned with the WRSE approach, the following updates have been made to option identification for WRMP24:
- Generic option screening has been revised to reflect the updated list of generic option types recommended by WRSE (refer to Section 7).
 - 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 in 200-year at WRMP19) and the need to plan for a long-term environmental destination that achieves and maintains a sustainable level of abstraction by 2050. Where this led to a change in screening decision this is highlighted in Section 2.2.
 - A review has been undertaken to identify new options to be considered in addition to the existing WRMP19 options. This process did not identify any new direct river abstraction options.
 - Further information on the WRMP screening process can be found in Section 7.

Feasibility Screening Criteria

19. The following tables detail the criteria used for feasibility screening, which is further detailed in the WRMP19 Direct River Abstraction Feasibility Report. This is a 3 stage process.
- Stage 1 – Assessment of absolute and other key constraints
 - Stage 2 - Assessment of site performance and compilation of short list
 - Stage 3 - Further detailed assessment

Stage 1

- Assessment of the options identified against absolute and other key constraints to the development of a new Direct River Abstraction - the criteria for which is detailed in Table 2. This is a pass / fail assessment for each criterion.
20. At Stages 2 and 3 the assessed performance of each option is reviewed against a red / amber / green classification system, as:
- **Red** – issue or constraint can be overcome, but will be very challenging
 - **Amber** – issue or constraint can be overcome
 - **Green** – no constraint posed
21. Additionally, Stage 3 allows for costing of each option to provide a comparison across all water resource options. The Stage 2 criteria are shown in Table 3 and the Stage 3 criteria are shown in .



| River Abstraction stage 1 assessment criteria | Basis for assessment |
|---|--|
| Property and legal criteria | |
| Sufficient area/Proximity to potential abstraction points | Is there sufficient space at the abstraction location, is it near or on a Thames Water site? |
| Planning and environmental criteria | |
| International nature conservation sites | Is any part of the option likely to impact on an existing conservation site, including Special Area of Conservation, Ramsar convention site, Special Protection Areas and SSSI? |
| International heritage sites | Is any part of the option likely to impact on an existing Heritage site? |
| Sufficient flow / Abstraction licence restrictions | Is there sufficient flow at the location of abstraction and are there any anticipated adverse effects on the waterbody due to abstraction. Will existing abstraction licenses or existing pass forward rates be affected? |
| Potential impact on downstream abstractors (including unlicensed) | Are there any downstream abstractors (prior to tidal reaches)? Will abstraction compromise their abstraction rates? |
| Water availability (CAMS Status) | Is the water resource suitable for licensing using the catchment management process? |
| Engineering criteria | |
| Source Quality (treatability) | Is the quality of the source currently treatable, within reasonable cost and technical feasibility? |
| Connectivity to wider infrastructure system. | Is there a significant distance between the abstraction point and treatment location? Is there a significant distance between the treatment location and preferred locations for discharge to the network? |
| Resilience to drought conditions | Is the source considered to be particularly vulnerable to drought conditions? |

Table 2: Criteria for Stage 1



| Criterion | Stage 2 criteria | Basis of assessment | | |
|--|---|---|--|---|
| | | Green | Amber | Red |
| Property & legal criteria | | | | |
| Ownership of site and tenancies | Is there sufficient space required to build the facilities? Is there sufficient space to accommodate future growth and permit changes? | Existing TW land is available and sufficient unconstrained space is available both for now and the future | Some TW land is available, additional land may also be acquired for treatment sites and/or pipelaying required in private land under Statutory Notice. Space is available but is constrained both for now and the future | No TW land available. Private land will need to be acquired. Pipelaying required in land that cannot be served with Statutory Notice. No extra space for growth/there is not enough space for the maximum Deployable output |
| Estimated land acquisition cost | Are land acquisition costs likely to be reasonable? | Land acquisition costs likely to be relatively low. Agricultural land and isolated properties only affected | Land acquisition costs likely to be moderate. Local or regional business or other facilities affected in addition to agricultural land | Land acquisition costs likely to be relatively high. National businesses or land required for statutory agency's business affected in addition to agricultural land |
| Planning, socio economic & environmental criteria | | | | |
| Land use and land use quality | Can brownfield land be reused? Will Best and Most Versatile Agricultural land be affected? Will existing non-agricultural high value land-uses be affected? | The site will reuse all brownfield land which appears to have low value use | The site contains some brownfield land to be re-used and is currently occupied by existing business/commercial use. | The site is entirely greenfield or occupied by high value business |
| Floodplain encroachment (loss of floodplain/need for compensation storage) | Percentage of site covered by flood plain | Less than 25% of the site within Flood Zones 2 or 3 or site solely located within flood zone 1 | Between 25-50% of the site located within Flood Zones 2 or 3 or if greater than 50% the site benefits from existing flood protection measures | Over 50% of the site located within Flood Zones 2 or 3 and site does not benefit from existing flood protection measures |
| Landscape character sensitivity | Are any landscape designations affected? | No designations likely to be affected or effect likely to be positive. Site unlikely to affect a national landscape designation | Designation of regional or local importance likely to be affected. The site lies within a locally designated landscape. | Designation of national importance likely to be affected. Site lies wholly or partly within or is likely to impact the setting of a national landscape |



| Criterion | Stage 2 criteria | Basis of assessment | | |
|---|---|---|---|--|
| | | Green | Amber | Red |
| | | and not covered by a local landscape designation. | | designation (National Park or AONB) |
| Views and visual amenity | Are any visually sensitive viewpoints affected? | Important / recognised viewpoints unlikely to be affected. Site lies at a distance greater than 5km from any recognised viewpoint | Locally visible / locally important views likely to be affected. Site lies at a distance of between 3km and 5km from any recognised viewpoint | Highly visible / Panoramic views likely to be affected. Site lies at a distance less than 3km from any recognised viewpoints |
| Nature conservation and biodiversity | Are any designated species and/or areas of nature conservation/biodiversity importance affected? | No national, regional or local designations likely to be adversely affected, or effect likely to be positive. Site does not contain sites of nature conservation importance | Designation of regional or local importance likely to be adversely affected. Site includes or lies within a regionally designated site (County Wildlife Site, Local Nature Reserve) | Designation of national importance and/or Ancient Woodland likely to be adversely affected |
| Archaeology and historic environment | Are any heritage assets affected? | Heritage interest low or unknown | Designation of regional or local importance likely to be adversely affected. No statutory designated sites present but site contains known non designated heritage assets | Nationally Designated Heritage Assets likely to be affected. Site includes an international / national heritage asset (World Heritage Site, Scheduled Monument, Listed Building of a type not considered to be an absolute constraint at Stage 1), Registered Historic Park or Garden, Listed battlefield site |
| Non-traffic impact of construction on local residents | Will construction activities (excluding traffic impacts) affect local residents within a 350m radius of the site? | Less than 100 residential properties likely to be affected by construction | Between 100 and 299 residential properties likely to be affected by construction | More than 300 residential properties likely to be affected by construction |
| Impact of construction on traffic | Will construction traffic affect local roads / built up areas? | Route largely not through built up areas and/or likely to have limited impacts on local traffic | Route partly through built up areas and/or likely to have moderate impacts on local traffic. | Route predominantly through built up areas and/or likely to have substantial impacts on local traffic |



| Criterion | Stage 2 criteria | Basis of assessment | | |
|--|---|---|---|---|
| | | Green | Amber | Red |
| Impact on recreation | Are recreational sites or rights of way affected? | No recreational resource / right of way disrupted or affected. Sites with no formal recreational activities | Recreational resource / right of way of local importance disrupted or affected. The site is likely to affect public rights of way | Recreational resource / right of way of national or regional importance disrupted or affected. The site is likely to affect major recreational activities |
| Water resources & water quality | Are there likely impacts on water resources and water quality, including Water Framework Directive objectives? | Minor adverse impacts likely; no risk to Water Framework Directive objectives | Moderate adverse impacts likely; low risk to Water Framework Directive objectives | Major adverse impacts likely; high risk to Water Framework Directive objectives |
| Engineering criteria | | | | |
| Network reinforcement requirements | Are significant network reinforcements likely to be needed to distribute water | No change to existing infrastructure | Limited modifications to existing network infrastructure | Significant network reinforcement required. |
| Length of conveyance | Total Length | The length of the transfer is less than 5km | The length of the transfer is between 5-25km | The length of the transfer is more than 25km |
| Pumping head | Pumping head - Is the pumping head significant? | The pumping head is <50m | The pumping head is between 50m-99m | The pumping head is in excess of 100m |
| Water source and availability | Uncertainty around deployable output Uncertainty around availability of recharge water for aquifer recharge and aquifer storage recovery | Deployable output guaranteed in all scenarios | Deployable output is affected by one or two issues that are expected to be resolved | Deployable output is affected by more than two issues or one issue that is unlikely to be resolved |
| Access during construction and operation | Are the means of access suitable, both for construction and operation? | Existing access arrangements are available and suitable for both construction and operation | Existing access will be suitable for operations, temporary modifications will be needed for construction activities | Existing access will require significant modification to make it suitable for both construction and operation |
| Resilience | Is the option resilient to climate change and other external pressures? | Option considered fully resistant to climate change | Option considered partially resistant to climate change | Option considered not resistant to climate change |



| Criterion | Stage 2 criteria | Basis of assessment | | |
|-------------------------|---------------------------|---|--|---|
| | | Green | Amber | Red |
| Construction complexity | Adverse ground conditions | No major crossings required or contaminated land risks identified | 1-5 major crossings required or contaminated land risks identified | Over 5 major crossings required or significant contaminated land risks identified |

Table 3: Criteria for Stage 2 and basis for assessment of site performance

| Criterion | Stage 3 criteria | Basis of assessment | | |
|--|---|--|---|--|
| | | Green | Amber | Red |
| Property and legal criteria | | | | |
| Ownership of site and tenancies | Assessment of ownership and tenancy constraints to any development | Land involved is under a single freehold title | Land involved has between 1 and 5 titles | More than 5 land titles involved |
| Planning, socio-economic and environmental criteria | | | | |
| Planning policy & history | Review of Local Plan planning policy designations and planning applications | The site is not allocated for significant development, there are no significant permissions or submitted applications, there are no policy constraints or the site benefits from positive policy support for reservoir development | The site has some policy constraints not considered significant and no significant permissions or applications. The site has significant permissions or applications but also benefits from positive policy support for reservoir development | The site or immediate area is allocated for significant development or has significant policy constraints. Extant planning permission or planning application has been submitted for significant development |
| Land use and land use quality | Extent of land take and land quality, greenfield vs brownfield mix | Construction is entirely within brownfield sites | Short term effects during construction phase only on greenfield sites | Permanent effects on greenfield sites as a result of reservoir development |
| Floodplain encroachment (loss of floodplain / need for compensation storage) | Are there likely effects on the floodplain? | No constraint posed | Issue or constraint can be overcome | Issue or constraint can be overcome, but will be very challenging |
| Landscape character sensitivity | Extent to which likely effects on landscape character & designations may be mitigated | No mitigation required | Mitigation may be employed to reduce impacts to an acceptable level | Adverse effects cannot be mitigated or constraint |



| Criterion | Stage 3 criteria | Basis of assessment | | |
|--|---|---|--|--|
| | | Green | Amber | Red |
| Views and visual amenity | Extent to which likely effects on visually sensitive receptors may be mitigated | No mitigation required | Mitigation may be employed to reduce impacts to an acceptable level | overcome resulting in adverse effects post mitigation Adverse effects cannot be mitigated or constraint overcome resulting in adverse effects post mitigation |
| Employment and local economy | Extent of construction and operational effects on employment & local economy | No loss of employment | Loss of land anticipated to provide a low density of employment opportunities (for example, fields that appear to be used for agricultural purposes) | Loss of land anticipated to provide a high density of employment opportunities (for example, a business park) |
| Nature conservation and biodiversity | Are there likely effects on sites / habitats and protected species | No constraint posed | Issue or constraint can be overcome | Issue or constraint can be overcome, but will be very challenging |
| Opportunity for biodiversity improvement | Extent of any opportunities for biodiversity enhancement | Site has potential improvement opportunities for both watercourse and woodlands | Site has potential improvement opportunities for either a watercourse or woodlands | No potential for improvement is possible |
| Archaeology and historic environment | Are there likely effects on heritage assets, including overall setting | No constraint posed | Issue or constraint can be overcome | Issue or constraint can be overcome, but will be very challenging |
| Non-traffic impact of construction on local properties | Potential to mitigate non-traffic construction impacts on local properties | No constraint posed | Issue or constraint can be overcome | Issue or constraint can be overcome, but will be very challenging |
| Impact on recreation | Are there likely effects on recreational activities | No constraint posed | Issue or constraint can be overcome | Issue or constraint can be overcome, but will be very challenging |
| Water resources & water quality | Are there likely impacts on water resources and water quality, including Water Framework Directive targets? | No constraint posed | Issue or constraint can be overcome | Issue or constraint can be overcome, but will be very challenging |

| Criterion | Stage 3 criteria | Basis of assessment | | |
|---|--|---|--|---|
| | | Green | Amber | Red |
| Engineering criteria | | | | |
| Length of conveyance | Length of conveyance route (s) and scale (pipe diameter or equivalent) | Very limited need to transfer water in new conveyance (e.g. abstraction and treatment on the same site) | Moderately long or large diameter water transfer conveyance, making use of existing infrastructure where possible | Long water transfer conveyance which is comprised of entirely new infrastructure and / or large diameter and / or significant tunnelling |
| Normalised cost | £/m3 | < £1.00/m3 | > £1.00/m3, <£1.50/m3 | > £1.50/m3 |
| Water source and availability | Constraints on water source utilisation / availability | Availability of water is well understood and not dependent on other constraints | Availability of water is well understood but dependent on other constraints | Significant constraints on the water availability |
| Water treatability / process complexity | Water treatment risks and complexity of required water treatment | Sufficient water quality data is available. No concerns highlighted with respect to water quality, standard treatment process to be employed | Water quality data is available although may have some limitations in terms of duration / frequency / parameters. Some concerns with water quality although relatively simple to treat | Limited water quality data is available in terms of duration / frequency / parameters. Significant concerns regarding water quality, risks remain about ability to treat. |
| Power supply | Is sufficient power available to power the site? | Existing power supply to the site is adequate | Existing power supply is not adequate, power supply can be brought into the site relatively simply | New power supply required which would be very difficult to achieve |
| Construction complexity | More detailed review of construction requirements | Construction complexity is anticipated to have no significant impacts on construction programme and cost | Construction complexity is anticipated to have minor impacts on construction programme and cost | Construction complexity is anticipated to have major impacts on construction programme and cost |

Table 4: Criteria for Stage 3 and basis for assessment of site performance



Feasibility Screening Updates

22. The overall changes to options and approach since WRMP19 are described in WRMP24 Section 7 Appraisal of Resource Options. Specific changes applicable to Direct River Abstraction Options are detailed in Table 5 and Table 6. These tables should be read alongside the WRMP19 report.



| WRMP19 Option Reference and name | WRSE ID Option Reference and name | Changes to the Option | WRMP19 Feasibility Screening Outcome | WRMP24 Feasibility Screening Outcome |
|----------------------------------|--|--|--------------------------------------|---|
| River Lee DRA2 | TWU_LON_HI-RAB_ALL_ALL_rivl eeabstractiontml | Option was previously rejected at WRMP19 due to being mutually exclusive with Deephams, however as Deephams is now being reviewed the River Lee DRA option has also been reviewed for WRMP24 to take account of environmental investigations carried out on the River Lee since WRMP19. Review ³ with the Environment Agency of a range of candidate water resources options to meet Thames Water’s 2030 drought resilience target has established that both Deephams Reuse and the Lower Lee DRA option are not environmentally promotable given the existing abstraction pressures on the Lower Lee. As such Thames Water has withdrawn these options as feasible options ⁴ from future WRMPs until the Environment Agency’s environmental | Included on Feasible List of Options | Included on Feasible List of Options with an earliest completion date of 2060 |

² Further Screening of River Lee DRA option is detailed in Section 7 – Options Appraisal

³ 13 October 2021: Project meeting between Thames Water, Environment Agency, Ricardo, and Atkins Ltd

⁴ Environment Agency, Natural Resources Wales and Ofwat (2021) Water Resources Planning Guideline

Section 8.22 states: You should confirm that there is no risk of deterioration from a potential new abstraction or from increased abstraction at an existing source before you consider it as a feasible option.



| WRMP19 Option Reference and name | WRSE ID Option Reference and name | Changes to the Option | WRMP19 Feasibility Screening Outcome | WRMP24 Feasibility Screening Outcome |
|--|--|---|---|--|
| | | destination objectives for the River Lee have been delivered in 2060. ⁵ Refer to Appendix A River Lee Summary of Position | | |
| RES-DRA-TED-300 Teddington DRA: Mogden Effluent Transfer 300 MI/d | TWU_KGV_HI-RAB_teddington dra 50 Teddington DRA Tertiary Treatment Plant - 50MI/d TWU_KGV_HI-RAB_teddington dra 75 Teddington DRA Tertiary Treatment Plant - 75MI/d | This is the treatment component of Teddington DRA The option capacity considered at WRMP19 was 300 MI/d. Further work has identified that the maximum credible limit for the option is 75 MI/d. Two option capacities have been developed - 50 MI/d and 75 MI/d. Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19. Refer to summary of Teddington DRA position provided in Appendix B. | Rejected at Feasibility stage, Validation | Options up to 75 MI/d : passed – included on Feasible List of options as part of the Teddington DRA option. Option was developed as part of the London Recycling SRO project and further information can be found in the Gate 2 reports. Options greater than 75 MI/d : rejected (Appendix B: Teddington DRA summary of position) |
| CON-RA-TED-TLT Teddington to Thames Lee Tunnel Shaft 300 MLD | TWU_KGV_HI-TFR_teddington dra ted/tlt Direct River Abstraction - Teddington to Thames Lee Tunnel Shaft | This is the intake / abstraction component of Teddington DRA The Teddington abstraction to Thames Lee Tunnel (TLT) connection is sized at 75 MI/d capacity. This includes intake structure and pipelines and connection onto Thames Lee Tunnel plus pumps for 75 MI/d. | Rejected at Feasibility stage, Validation | Passed – included on Feasible List of options as part of the Teddington DRA option. Option was developed as part of the London Recycling SRO project and further information can be found in the Gate 2 reports. |

⁵ Summary of position following discussions between Environment Agency and Thames Water on water environment effects of a Lower Lee Direct River Abstraction water resources option Dec 2021 v0.2 (003)



| WRMP19 Option Reference and name | WRSE ID Option Reference and name | Changes to the Option | WRMP19 Feasibility Screening Outcome | WRMP24 Feasibility Screening Outcome |
|---|--|--|---|--|
| | | Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19. | | |
| CON-RA-MOG-TED-TUN Mogden STW to Teddington Weir Recycled Water Transfer Tunnel | TWU_WLJ_HI-TFR_teddington dra mog/ted Teddington DRA Conveyance from Mogden to River Thames (Teddington Outfall) | This is the conveyance component of Teddington DRA The design of the conveyance has been revised to reflect the reduced option capacity. Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19. | Rejected at Feasibility stage, Validation | Passed – included on Feasible List of options as part of the Teddington DRA option. Option was developed as part of the London Recycling SRO project and further information can be found in the Gate 2 reports. |

Table 5: Option changes since WRMP19

| WRMP19 Option Name | WRMP24 Option Name | WRMP19 DO (MI/d) | | WRMP24 DO (MI/d) | | | Difference (MI/d) | | Impact on Feasibility Assessment Scoring (all options Passed Stage 3 and Fine Screening – on Constrained List at WRMP19) |
|---|----------------------------------|------------------|------|------------------|------------------|---------------|-------------------|------|--|
| | | Average | Peak | 1 in 2 average | 1 in 500 average | 1 in 500 peak | Average | Peak | |
| Teddington DRA: Mogden Effluent Transfer 300 MI/d | TWU_KGV_HI-RAB_teddington dra 50 | 268 | N/A | 46 | 46 | 46 | N/A | N/A | DO has reduced as option capacity has reduced, no impact on feasibility assessment scoring |
| | TWU_KGV_HI-RAB_teddington dra 75 | | | 67 | 67 | 67 | N/A | N/A | DO has reduced as option capacity has reduced, no impact on feasibility assessment scoring |

Table 6: Option DO changes since WRMP19

Strategic resource options

24. This section outlines the updates made to SRO options at WRMP24 and through development through the Ofwat Gate 1 and Gate 2 submissions.
25. Teddington Direct River Abstraction (50MI/d and 75MI/d options)
26. At WRMP19 the option was developed with a capacity of 300 MI/d and was rejected at the Validation Stage of the Feasibility Assessment due to potential temperature effects and concerns of impact on aquatic ecology.
27. Teddington DRA (50MI/d and 75MI/d options) has passed screening at WRMP24 and are on the Feasible List.
28. At Gate 1, the option was considered with a maximum capacity of 150 MI/d. Further work was undertaken through Gate 2 to understand the risk of effects for different capacity schemes to both the freshwater and estuarine Thames. Results for the 100 and 75 MI/d options show a very low risk of breaches to thermal plume characteristics and therefore Teddington DRA was capped at a maximum of 100 MI/d for Gate 2. Information on the further investigations can be found in the Gate 2 submission.
29. Since Gate 2 further engagement has taken place with the Environment Agency which has identified a credible capacity limit of 75 MI/d for this option, see Appendix B for summary of current position.
30. The Teddington DRA option design has been further developed for WRMP24 considering phases of 50 MI/d and 75 MI/d. The design of the conveyance elements has been updated to reflect the reduced maximum capacity of the option. Refer to London Effluent Reuse Gate 2 submission for development of the engineering design and environmental assessment since WRMP19.
31. The following conveyance elements are required as part of the Teddington DRA option; they would be constructed with the initial phase and have sufficient capacity for all subsequent phases:
 - **Mogden to River Thames (Teddington Outfall)** – the design of this element has changed from a large diameter tunnel at WRMP19 to a smaller pipe-jack (microtunnel) option for WRMP24. The indicative alignment of the tunnel and the location of the outfall have been reviewed.
 - **Direct River Abstraction - Teddington to Thames Lee Tunnel** – the screens and intake pumping station that abstracts water from the River Thames and puts it into the TLT has been redesigned (to the level of detail required at this stage of the design) to account for the smaller capacity.
32. Cumulative limits
33. 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 MI/d in order to mitigate impacts on potentially sensitive ecological receptors.
34. A cumulative limit on the total additional capacity of water reuse and desalination options, that decrease in freshwater inputs to the Tideway, of 366 MI/d has therefore been included in the regional modelling. River Lee DRA capacity is included within this cumulative limit.

35. Further investigation of the cumulative limit is ongoing and will continue to be reviewed through WRMP29.

Updated Feasibility Assessment

Feasibility Assessment Approach

36. This section of the report outlines the updates made in WRMP24 to the WRMP19 feasibility assessment. This should be read alongside the WRMP19 Direct River Abstraction feasibility report. Where options have been rejected through the screening process the rejection reason is recorded in WRMP24 Appendix Q - Scheme rejection register.
37. A three-stage feasibility screening approach was employed for WRMP24, this approach is unchanged from WRMP19, details of the approach can be found in the WRMP19 Direct River Abstraction feasibility report.
38. 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 water resources needs of Thames Water and, where applicable, neighbouring companies. However, the predicted water resources need for the region at WRMP24⁶ 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 WRMP19⁷
39. 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 when estimating potential resource needs. 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.

Stage 1 Assessment Results

40. At WRMP19 a total of 10 options, in combination with 10 sub-options, were identified at Stage 1 through a top-down review of surface water availability and bottom-up review of WRMP14 options:
 - Option 1: New Intake at Three Mill Lock on the Lower River Lee:
 - Option 1a: transfer to the River Lee Diversion at the top of King George V Reservoir
 - Option 1b: transfer to North Woolwich Road site for treatment to potable quality, followed by transfer to Woolwich Common Service Reservoir
 - Option 2: Intake at Culham on the site of disused intake :
 - Option 2a: transfer to Farmoor Reservoir via a new raw water main
 - Option 2b: treatment and direct supply to SWOX (Swindon and Oxford WRZ)
 - Option 3: Transfer of effluent from Mogden STW to downstream/upstream of Teddington Weir, allowing additional abstraction upstream of Teddington Weir:

⁶ <https://wrse.uk.engagementhq.com/the-challenge>

⁷ 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.

- Option 3a: New intake upstream of Teddington Weir near existing Thames Lee Tunnel location, transfer direct to Thames Lee Tunnel with no proposed treatment
 - Option 3b: New intake upstream of Teddington Weir and transfer to existing West London raw water reservoir for storage
 - Option 3c: New intake and treatment plant upstream of Teddington Weir, full treatment and put into supply
 - Option 4: Transfer from Mogden STW to downstream/upstream of Teddington Weir, allowing increased abstraction at existing Thames Water intakes
 - Option 5: Transfer of effluent from Beckton STW to downstream/upstream of Teddington Weir, allowing additional abstraction upstream of Teddington Weir:
 - Option 5a: New intake upstream of Teddington Weir near existing Thames Lee Tunnel location, transfer direct to Thames Lee Tunnel with no proposed treatment
 - Option 5b: New intake and treatment plant upstream of Teddington Weir, and transfer to an existing reservoir for storage
 - Option 5c: New intake and treatment plant upstream of Teddington weir, full treatment and put into supply
 - Option 6: New intake on the Lower River Roding, abstraction and transfer to Lee Valley Reservoirs, or full treatment and put into direct supply
 - Option 7: New intake on the River Mardyke with full treatment and flows put directly into supply
 - Option 8: New intake on the River Rom/Beam with full treatment and flows put directly into supply
 - Option 9: New intake on the River Ingrebourne with full treatment and flows put directly into supply
 - Option 10: New intake at Days Weir and transfer to Farmoor Reservoir or Farmoor WTW
41. No new options have been identified at WRMP24.
42. The Stage 1 assessment of WRMP24 options is presented in Table 7 and is unchanged from WRMP19.



| Stage 1 Criteria | Option 1 New intake at Three Mill's Lock | Option 2a Intake at Culham and transfer to Farmoor Reservoir | Option 2b Intake and treatment at Culham and supply to SWOX | Option 3 Mogden transfer new abstraction | Option 4 Mogden transfer increased abstraction | Option 5 Beckton transfer new abstraction | Option 6 New intake at River Roding | Option 7 River Mardyke | Option 8 River Rom/ Beam | Option 9 River Igrebourne | Option 10 Abstraction at Days |
|---|---|---|--|---|---|--|--|---------------------------|-----------------------------|------------------------------|----------------------------------|
| Sufficient area / Proximity to potential abstraction points | ü | ü | ü | ü | ü | ü | ü | ü | ü | ✓ | ü |
| International nature conservation sites | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü |
| International heritage sites | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü |
| Sufficient flow / Abstraction Licence restrictions | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü |
| Potential impact on downstream abstractors (including unlicensed) | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü |
| Source Quality (treatability) | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü |
| Connectivity to wider infrastructure system | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü |
| Water Availability (CAMS Status) | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü |
| Resilience to drought conditions | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü | ü |
| Stage 1 Results | Pass | Fail | Pass | Pass | Fail | Fail | Fail | Fail | Fail | Fail | Fail |

Table 7: Stage 1 assessment of all options

Note: The Stage 1 assessment for SRO options had not been reviewed at WRMP24.



43. The reasons for the option rejection are included in WRMP24 Appendix Q - Scheme rejection register.
44. Further details regarding the Stage 1 assessments are included for WRMP19 option in the Direct River Abstraction Feasibility Report.

Stage 2 assessment results

45. The Stage 2 assessment of the WRMP19 and WRMP24 options that passed Stage 1 is presented in Table 8 providing the red, amber, green assessment of the criteria described in the WRMP19 Direct River Abstraction Feasibility Report. Four options passed the Stage 2 assessment. Further details are included in the WRMP19 Direct River Abstraction Feasibility report.
46. No changes were made to the WRMP19 RAG status.



| Criteria | Option 1a | Option 1b | Option 2b | Option 3a | Option 3b | Option 3c |
|---|-----------|-----------|-----------|-----------|-----------|-----------|
| Property & legal | | | | | | |
| Ownership of Site and Tenancies | Yellow | Red | Yellow | Red | Red | Red |
| Estimated Land Acquisition | Yellow | Red | Green | Red | Red | Red |
| Planning & environmental | | | | | | |
| Land Use and Land Use Quality | Yellow | Yellow | Yellow | Red | Red | Red |
| Floodplain Encroachment | Yellow | Red | Green | Green | Red | Red |
| Landscape Character Sensitivity | Green | Green | Green | Yellow | Yellow | Yellow |
| Views and Visual Amenity | Green | Yellow | Green | Green | Green | Green |
| Nature Conservation and Biodiversity | Yellow | Yellow | Green | Yellow | Yellow | Yellow |
| Archaeology and Historic Environment | Red | Red | Red | Red | Red | Red |
| Non-traffic Impact of Construction on Local Residents | Red | Red | Green | Red | Red | Red |
| Impact of Construction on Traffic | Red | Red | Yellow | Yellow | Yellow | Yellow |
| Impact on Recreation | Yellow | Yellow | Green | Yellow | Yellow | Yellow |
| Water Resources & Water Quality | Yellow | Yellow | Green | Yellow | Yellow | Yellow |
| Engineering Criteria | | | | | | |
| Network Reinforcement Requirements | Yellow | Red | Yellow | Red | Red | Red |
| Length of Conveyance | Yellow | Yellow | Green | Yellow | Green | Green |
| Pumping Head | Green | Red | Green | Yellow | Green | Green |
| Water Source and Availability | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |
| Access during Construction and Operation | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |
| Resilience | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |
| Construction Complexity | Red | Red | Yellow | Yellow | Red | Yellow |
| Stage 2 Assessment Outcome | Pass | Fail | Pass | Pass | Pass | Fail |

Table 8: Stage 2 assessment of all options

Notes:

Option 1a - Transfer to Lee Valley Reservoirs, Option 1b – Treatment new Three Mills Lock and Supply to local distribution, Option 2b – Intake at Culham on the site of disused intake, Option 3a – Teddington Direct River Abstraction with transfer to Thames-Lee Tunnel, Option 3b - Teddington Direct River Abstraction with transfer to Queen Mother Reservoir, Option 3c - Teddington Direct River Abstraction with full treatment and supply to network.

The RAG assessment for SRO options had not been reviewed at WRMP24.

47. Two options were rejected at Stage 2; the reasons for the option rejection are included in the WRMP24 Appendix Q - Scheme rejection register.
48. There are no changes to the WRMP19 Stage 2 feasibility assessment outcomes and the following options were therefore taken forward to Stage 3:
 - Option 1a: New Intake at Three Mill Lock on the Lower River Lee, partial treatment and transfer flow to King George V reservoir via Lockwood
 - Option 2b: Intake at Culham on the site of disused intake, treatment and direct supply to SWOX
 - Option 3a: Transfer of treated effluent from Mogden STW to Teddington Weir, allowing additional abstraction upstream of Teddington Weir. New intake upstream of Teddington Weir near existing Thames Lee Tunnel location. Direct transfer to Thames Lee Tunnel with no proposed treatment
 - Option 3b: Transfer of treated effluent from Mogden STW to Teddington Weir, allowing additional abstraction upstream of Teddington Weir. New intake and treatment plant upstream of Teddington Weir, to provide partial treatment and transfer to reservoir for storage

Stage 3 assessment results

49. Assessment against Stage 3 criteria of options has been undertaken for all options that passed Stage 2.
50. The Stage 3 assessment of the WRMP19 and WRMP24 options that passed Stage 2 is presented in Table 9 providing the red, amber, green assessment of the criteria described in WRMP19 Direct River Abstraction Feasibility report. Two options passed the Stage 3 assessment. Further details are included in the WRMP19 Direct River Abstraction Feasibility report.
51. No changes were made to the WRMP19 RAG status.



| Criteria | Option 1a: River Lee DRA | Option 2b: abstraction at Culham | Option 3a: Teddington DRA to supply to Thames Lee Tunnel | Option 3b: Teddington DRA supply to West London |
|--|-----------------------------|--|--|--|
| Property & legal | | | | |
| Ownership of Site and Tenancies | Yellow | Yellow | Red | Red |
| Planning, socio-economic & environmental | | | | |
| Planning Policy and History | Red | Red | Red | Red |
| Land Use and Land Use Quality | Red | Yellow | Red | Red |
| Floodplain Encroachment (loss of floodplain / need for compensation storage) | Yellow | Green | Green | Yellow |
| Landscape Character Sensitivity | Green | Green | Yellow | Yellow |
| Views and Visual Amenity | Yellow | Green | Yellow | Yellow |
| Employment and Local Economy | Green | Green | Green | Green |
| Nature Conservation and Biodiversity | Yellow | Green | Yellow | Yellow |
| Opportunity for Biodiversity Improvement | Yellow | Yellow | Yellow | Yellow |
| Archaeology and Historic Environment | Red | Yellow | Red | Red |
| Non-traffic Impact of Construction on Local Residents | Yellow | Green | Red | Red |
| Impact on Recreation | Yellow | Green | Yellow | Yellow |
| Water Resources & Water Quality | Yellow | Green | Yellow | Yellow |
| Engineering Criteria | | | | |
| Length of Conveyance | Yellow | Green | Red | Red |
| Normalised Cost – CAPEX, OPEX Carbon and Optimism Bias Cost | Green | Red | Green | Green |
| Water Source and Availability | Yellow | Green | Yellow | Yellow |
| Water Treatability and Process Complexity | Yellow | Yellow | Yellow | Yellow |
| Power Supply | Green | Green | Green | Green |
| Construction Complexity | Red | Yellow | Red | Red |
| Stage 3 Assessment Outcome | Pass | Fail | Pass | Fail |

Table 9: Stage 3 assessment

Notes: The RAG assessment for SRO options had not been reviewed at WRMP24

52. Two options were rejected at Stage 3; the reasons for the option rejection are included in WRMP24 Appendix Q - Scheme rejection register.
53. The following list of options passed Stage 3 feasibility assessment and were taken forward for further consideration:
 - Option 1a: New Intake at Three Mill Lock on the Lower River Lee, partial treatment and transfer flow to King George V reservoir via Lockwood.
 - Option 3a: Transfer of effluent from Mogden STW to Teddington Weir, allowing additional abstraction upstream of Teddington Weir. New intake upstream of Teddington Weir near existing Thames Lee Tunnel location. Direct transfer to Thames Lee Tunnel with no proposed treatment.

Option Verification and Conclusion

55. The validation discussion of risk and uncertainty in Section 7 of the WRMP19 Water DRA Feasibility report remains unchanged. Where options have been rejected through the screening process the rejection reason is recorded in WRMP24 Appendix Q - Scheme rejection register.

Validation

56. River modelling at WRMP19 identified that one of the likely impacts of the 300 MI/d option would be an increase in water temperature in the freshwater River Thames locally above Teddington Weir and in the Upper Tideway as a consequence of discharging treated effluent at Teddington. The potential temperature effects were identified as a key concern to aquatic ecology, and the Environment Agency advised that mitigation would need to achieve a zero temperature increase.
57. Further work undertaken by the London Effluent Reuse SRO has identified that the maximum credible limit for the option at the time of programme appraisal is 75 MI/d (see Appendix B). Option capacities above 75 MI/d are therefore rejected.

Confirmation of feasible list of options

58. The following list of options are the confirmed list of feasible DRA options for WRMP24:
- Teddington DRA (up to 75MI/d)
 - River Lee DRA

Summary of Further Screening

59. This report summarises changes to the DRA options up to the end of feasibility screening. It should be noted that River Lee DRA is mutually exclusive with Deephams Reuse. At WRMP19 River Lee DRA was rejected following fine screening as Deephams Reuse was found to be the preferred option. This was backchecked at WRMP24. Deephams Reuse was again found to be the preferred option and River Lee DRA was rejected as a result at Further Screening. Neither Deephams Reuse or Lower Lee DRA can be delivered before 2060, this does not change the screening decision (Appendix A).
60. For further details on rejection reasoning refer to Appendix Q – Rejection Register. Information on option development and investment modelling can be found in WRMP24 Section 7 - Appraisal of Resource Options.

Reference information

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

[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](#)

A. River Lee Summary of Position

61. Summary of position following discussion between the Environment Agency and Thames Water on water environment effects of a Lower Lee Direct River Abstraction water resources option.

Thames Water's Water Resources Management Plan 2019 position

62. A Lower Lee direct river abstraction (DRA) was considered as a feasible option in Thames Water's Water Resources Management Plan 2019 (WRMP19), but was not included in the constrained list of options⁸ on account of it being mutually exclusive with a Deephams STW Reuse option. The feasible option had a transfer rate of 35MI/d. The Deephams STW Reuse option was reported to perform better than the Lower Lee DRA option in a number of respects including having a higher deployable output, lower cost and better operability.
63. Prior to that, at WRMP14⁹, a Lower Lee DRA option was considered as a feasible option and subject to the range of water resources planning guideline environmental appraisals at that time. In WRMP14 a Lower Lee DRA option was not included in the preferred programme of the adopted plan.

Revised Draft Summary of Position

64. Through discussion¹⁰ with the Environment Agency of a range of candidate water resources options to meet Thames Water's 2030 drought resilience target has established that a Lower Lee DRA option has potential environmental risk. As such Thames Water has withdrawn the option as a feasible option¹¹ from future WRMPs in the medium-term period to 2060.
65. At times of operation, a Lower Lee DRA option would reduce flow in the lowest reach of the River Lee prior to the tidal limit at Three Mills Lock. For the stretch of the Lower Lee impacted by the scheme, the WFD classification¹² for hydrological regime is 'Does not support Good'. In the Water Resources National Framework¹³, the Environment Agency utilised a bespoke spreadsheet tool (Waterbody Abstraction Tool) to estimate water balance deficits in 2050; and some of the reaches downstream of a Deephams STW Reuse option have been identified to have a water balance deficit. For the Lower Lee, the calculated deficit is substantial and ranges between 425-521MI/d under a range of scenarios for the reach impacted by this scheme. The Water Resources South East

⁸ Thames Water (2018) Water Resources Management Plan 2019 Resource Options Fine Screening Report Update September 2018

⁹ Thames Water (2014) Final Water Resources Management Plan 2015-2040 Main Report Section 7: Appraisal of Options

¹⁰ 13 October 2021: Project meeting between Thames Water, Environment Agency, Ricardo, and Atkins Ltd

¹¹ Environment Agency, Natural Resources Wales and Ofwat (2021) Water Resources Planning Guideline Section 8.22 states: You should confirm that there is no risk of deterioration from a potential new abstraction or from increased abstraction at an existing source before you consider it as a feasible option.

¹² WFD classification as reported by Environment Agency Catchment Data Explorer: <https://environment.data.gov.uk/catchment-planning/WaterBody/GB106038077852>

¹³ Environment Agency (2020) Meeting our future water needs: a national framework for water resources. Version 1. 16 March 2020

Regional Group is working with water companies and the Environment Agency to develop the most appropriate environmental ambition scenarios for the South East to redress these deficits.

66. The flow reduction associated with a Lower Lee DRA 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 Lower Lee DRA 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.

Background to current position

67. Through the Water Resources National Framework, the proposed approach to define the longer-term aquatic environment requirements of catchments is to use flow indicators and in so doing to develop potential future flow targets. A Lower Lee DRA option needs considering in that context. A Lower Lee DRA option would operate intermittently, as a strategic asset, at times of sustained low river flow and environmental drought. As such it would adversely change the flow regime of the Lower River Lee compared with flow targets as detailed in the Environment Agency Waterbody Assessment Tool (2021) and that cannot be off-set by other flows generated by the remaining Lower Lee watercourses.
68. Note that a Deephams STW Reuse option was included as preferred option in the adaptive pathway of Thames Water's adopted WRMP19¹⁴ but has subsequently been withdrawn as the preferred WRMP19 by Thames Water. A Lower Lee DRA option is no longer constrained as mutually exclusive and became available for review as a water resources option.
69. A Lower Lee DRA option has not been developed through WRMP19 or since. It is not a component part of the London Effluent Reuse Strategic Resource Option. The conceptual design remains as set out in WRMP14 with abstraction from the freshwater River Lee, close to the tidal limit at Three Mills Lock, and pumping water into Thames Water's existing reservoir storage network in the Lower Lee Valley. The conceptual design does not include any flow augmentation. Large uncertainties remain about the scheme detail, including how these would influence environmental assessment, mitigation and cost.
70. Setting out a detailed approach to assessing environmental impacts and reviewing the WFD Regulations compliance of the option does not resolve the effect of the option on achieving the advised flow targets. The extensive programme of monitoring that would be required to secure acceptability of mitigation of effects on flow targets sufficient to enable a Lower Lee DRA option, for example through flow augmentation elsewhere in the catchment, is not considered by Thames Water to represent value for money to customers. This is why the option has been withdrawn as a feasible option for WRMP24.

¹⁴ Thames Water (2020) Final Water Resources Management Plan 2019 Section 11: Preferred plan <https://www.thameswater.co.uk/media-library/home/about-us/regulation/water-resources/technical-report/preferred-plan.pdf>

B. Teddington DRA Summary of Position

71. Summary of position following discussion between the Environment Agency and Thames Water on Teddington DRA 100MI/d option (August 2023)

Background

72. A Teddington Direct River Abstraction (DRA) scheme was originally proposed as part of the draft Water Resource Management Plan 2019 (dWRMP19) at a size of 300MI/d.
73. Following consultation on the dWRMP19, a Statement of Common Understanding between Thames Water and the Environment Agency¹⁵ was published stating that Water Framework Directive (WFD) compliance of a 300MI/d Teddington DRA scheme was uncertain primarily due to potential temperature impacts and therefore the scheme was not environmentally promotable at that time. In the Statement, Thames Water committed to undertake further research into the sensitivity of the Lower Thames ecosystem to smaller DRA discharges and viable mitigation approaches.
74. As part of the RAPID Strategic Resource Option (SRO) Gate 1 and taking account of the dWRMP19 findings and the Statement of Common Understanding, the London Water Recycling SRO has assessed a Teddington DRA scheme in size increments of 50MI/d¹⁶ and 75MI/d¹⁷ up to a largest size of 150MI/d¹⁸. Based on further work completed and reported at Gate 2 in November 2022, Thames Water investigated and rejected options greater than 100MI/d due to the continued potential risk of not complying with WFD objectives and Environment Agency guidance.
75. At the end of 2022, Thames Water issued its dWRMP24 for consultation which included Teddington DRA at 75MI/d and continued to investigate differences between 75MI/d and 100MI/d sized schemes as part of its Gate 2 Priority Actions and progress toward RAPID Gate 3.
76. The key differences between scheme sizes are as follows:
 - From a physical dimension perspective, much of the infrastructure required would remain the same size irrespective of whether a scheme was 75MI/d or 100MI/d, with the exception of the intake and outfall which would slightly increase for a 100MI/d scheme (+0.7m and +1m in width respectively) and therefore result in greater land take on the bank of the River Thames.

¹⁵ Common Understanding Teddington DRA13-07-2018 FINAL

¹⁶ Chosen on the basis as 50MI/d being the minimum size for a SRO scheme.

¹⁷ Chosen on the basis of being a mid-point of a 150MI/d scheme.

¹⁸ Chosen to test the upper limit of environmental promotability, on the basis that during current 300MI/d Teddington Target Flow (TTF) conditions, current Mogden STW final effluent discharging to the estuarine upper Tideway at Isleworth Ait could be in the order of 320MI/d discharge (i.e. ~1:1 dilution factor under low tide conditions), and a Teddington DRA scheme sized at 150MI/d would be proportional with this current approach. At a 150MI/d capacity in the take-put DRA arrangement, abstraction would occur upstream of Teddington at a rate of 50% of 300MI/d TTF (noting that actual flow over Teddington Weir rarely falls to that value or for prolonged periods due to river management practices), retaining 150MI/d in the river between abstraction and discharge, to then mix the 150MI/d DRA discharge at a similar 1:1 ratio at low tide.

- There would be no change in river level at Teddington; however, there would be a further reduction in water level at Isleworth for the 100MI/d scheme versus the 75MI/d scheme with less final effluent being discharged for the 100 MI/d option.
 - Difference in velocity between the 75MI/d and 100MI/d schemes is negligible under worst case 300MI/d (extreme low) river flows.
 - A 100MI/d scheme would cause slightly greater temperature increase, with modelling suggesting the 2°C contour extending 2m further into the channel at the outfall location compared to the 75MI/d scheme.
 - There is negligible difference in physico-chemical and WFD water quality concentrations between the 75MI/d and 100MI/d schemes.
77. This shows from a technical standing that there is only marginal difference in terms of quantifiable environmental risk between a 75MI/d and 100MI/d scheme, based on the modelling work undertaken to date.
78. However, the Environment Agency has made it clear through its representation on the dWRMP and through communication with Thames Water that any increased detriment to the river Thames beyond that of the 75MI/d option in Thames Water's draft WRMP would not be acceptable. Furthermore, although the 75MI/d option falls well within the current expectations of the Environment Agency for temperature profile, plume size etc, any improvements to the 75MI/d option to reduce the environmental effects seen in the modelled analysis, however small, would be of great benefit. The ongoing development of the option will continue to consider this.
79. In addition to the above, it is worth noting that through the dWRMP consultation in 2023, the Teddington DRA scheme received significant scrutiny and a high number of responses from consultees expressing concerns, with upwards of 1,000 individual responses in relation to the environment, health, recreation and value for money. While much of this concern is a factor of the early stage of the scheme's development and is reflective of the high-level risk assessments completed to that point, the strength of public opinion against the scheme is an important factor. This feedback has been taken into account in developing our position on the scheme size for the revised dWRMP and progression through Gate 3.

Teddington DRA scheme summary of position as of August 2023

80. In summary, progression of further studies and modelling by Thames Water has shown marginal increased environmental risks associated with the 100MI/d option compared to the 75MI/d option. Overall these have been shown to be minimal in the work undertaken to date.
81. The Environment Agency requires that any option minimises the level of detriment to the river Thames at this location. It has indicated that scheme sizes greater than 75MI/d would not be environmental promotable.
82. Taking account of these points, as well as representations received expressing concerns around the environment, health and recreation in relation to the scheme, the maximum size of Teddington DRA to be included in the revised dWRMP and progressed to Gate 3 is 75MI/d.

