A vital drought resilience project for London

Teddington Direct River Abstraction project update

September 2024

Contents

Foreword

Nevil Muncaster
Engineering and Asset Management Director, Thames Water

Hello.

Severe drought poses serious consequences for London and the South East and so it's vital that we bolster London's water supplies.

We're expecting hotter, drier summers, and we need to act now.

A major part of the solution is fixing leaks in our and our customers' pipes, which we're doing, whilst encouraging people to use water more wisely. But we also need to build new infrastructure capable of adding to London's water supplies.

We're proposing several projects across the South East, including a new river abstraction and water recycling network in Hounslow, Richmond and Kingston (known as the Teddington Direct River Abstraction project), which would help to fill our reservoirs in the Lee Valley during times of prolonged dry weather.

Since our public consultation last year, on initial site options for the project, we've made several big changes to our proposals, and you can find out more about these in this brochure.

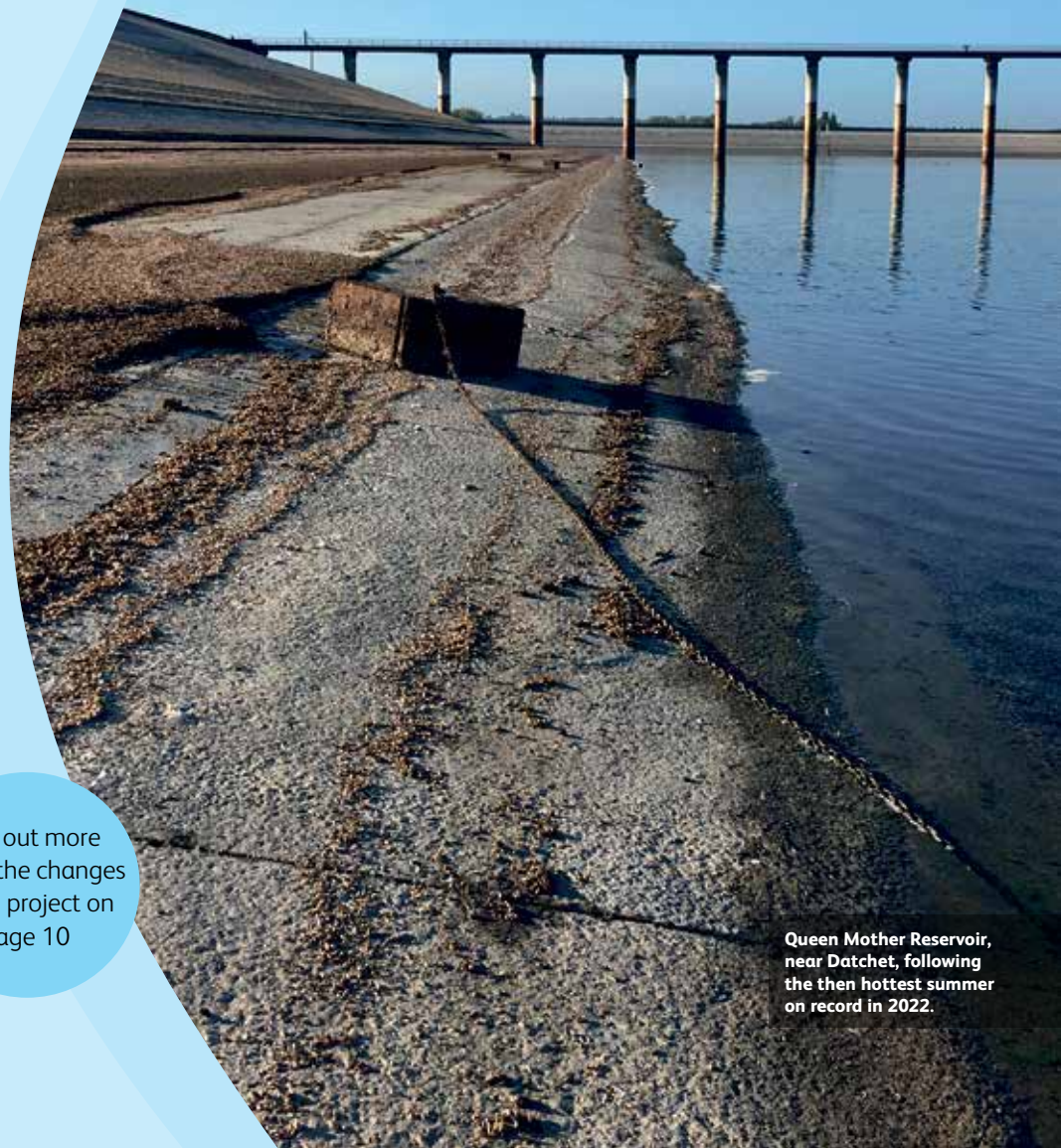
Working with local communities and listening to feedback is at the heart of our process and we're grateful to everyone who took the time to respond to the public consultation.

We're also holding several community information events in the coming weeks, to explain the changes, and I encourage you to come along if you can.

Best wishes

Nevil Muncaster

In Summer 2022, then the hottest on record and the driest since 1995, reservoir and river levels in London and the South East dropped way below expected levels, and wildlife, habitats and farmland were badly impacted.



Queen Mother Reservoir, near Datchet, following the then hottest summer on record in 2022.

Find out more about the changes to the project on page 10

Planning for water shortages

Climate change is increasing the risk of severe droughts, which are now expected to be much worse than those of 1976 and 2022.

The South East of England is one of the driest parts of the UK and is classified by the Environment Agency as "seriously water stressed".

Summers are expected to get hotter and drier, with more frequent and intense weather extremes predicted.

At the same time, we expect demand for water to keep growing, as London's population is forecast to grow to around 10 million by 2050.

If we do nothing, it's not a matter of *if* our water starts to run out, it's a matter of *when*.

Not having enough water could mean:

- Schools and businesses being closed
- Water restrictions or rationing, for example relying on standpipes in streets
- Decreasing crop yields and higher food prices

It's estimated that a severe drought could cost London's economy alone as much as £500 million a day. In the wake of the pandemic, we cannot afford to take that risk.

It's vital that we plan for water shortages in London now – upgrading existing infrastructure, learning to manage and use water more wisely and, critically, developing new sources of drinking water.

Finding new sources of drinking water for London

It is expected that London and the Thames Valley will need an extra 1 billion litres of water every day by 2050.

We have robust plans in place to reduce water leakage, and the government has pledged to support water companies to encourage customers to use less water.

We have set a goal to more than halve leakage by 2050 and, in line with national targets, we are working to reduce daily water use to 110 litres per person by 2050, with current water use in the area at around 140 litres per person.

But on their own, these things are not enough: we must find new sources of drinking water for London.

Recognising the potential scale of the problem, the government, our regulators and water companies are working together to plan new water storage and supply solutions.

Our proposed river abstraction and water recycling project in Hounslow, Richmond and Kingston, known as "Teddington Direct River Abstraction", is one of these.

Fixing leaks in our network

We have an ongoing programme of work to repair pipes in our network, prioritising the most serious.

We have set a goal to more than halve leakage by 2050 and we are focused on achieving that.

In 2022/23 we fixed a total of 66,896 leaks, compared with 61,671 in 2021/22, and over the next two years we're investing £200 million to replace water mains.

Our Water Resources Management Plan 2024

Every five years, water companies publish Water Resources Management Plans, setting out how they intend to provide a secure water supply for their customers in the context of climate change and the need to protect and improve the environment.

In August 2024 our Water Resources Management Plan (WRMP) was approved by the government.

Underpinning the plan is a commitment to reduce both leakage and customer demand for water but by themselves, these aren't enough.

The government also agreed that there is a strategic need for the Teddington Direct River Abstraction project as well as a new reservoir in Oxfordshire, to ensure we have resilient and secure water supplies for the future.

A vital new drought resilience project for London

Water is too precious a resource to only use once.

The Teddington Direct River Abstraction (TDRA) project would combine existing infrastructure with new tunnels, deep underground, and other new infrastructure in the boroughs of Hounslow, Richmond and Kingston.

During periods of prolonged dry weather, water would be taken (abstracted) from the River Thames close to Teddington Weir, and conveyed via a short new section of tunnel to an existing tunnel, called the Thames Lee Tunnel, connecting this part of South West London with our reservoirs in the Lee Valley (North East London).

The water that's drawn from the river would need to be replaced, and we're proposing to do this using highly-treated recycled water from a new water recycling facility at Mogden Sewage Treatment Works in Isleworth.

This way, we'd be able to draw additional water supplies from the river, during droughts, whilst ensuring river levels are maintained and the river environment and ecology protected.

The diagram opposite shows how the project would work, to secure our water supplies.

The project could provide up to...

75 million litres of water a day (75Ml/d)

...that's equivalent to

30 Olympic-sized swimming pools

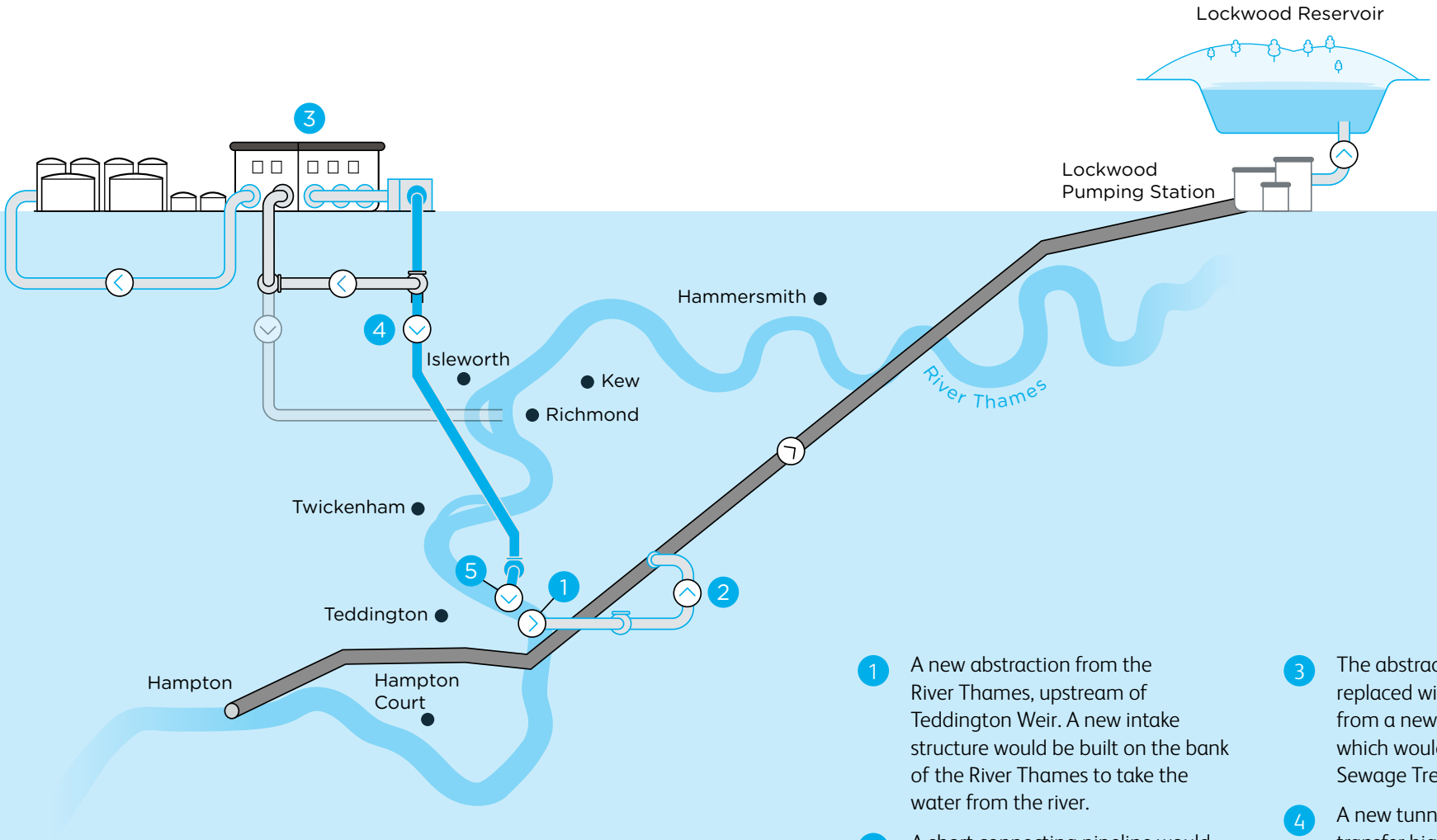
...or enough water for approx 500,000 people

It will be in use by

2033

4km

Teddington tunnel



1. A new abstraction from the River Thames, upstream of Teddington Weir. A new intake structure would be built on the bank of the River Thames to take the water from the river.
2. A short connecting pipeline would be built underground to move the abstracted water to an existing tunnel and then onto storage reservoirs in the Lee Valley to be treated to become drinking water.
3. The abstracted water would be replaced with highly treated water from a new water recycling facility, which would be located at Mogden Sewage Treatment Works.
4. A new tunnel would be built to transfer highly treated water, from a new water recycling facility which would be located at Mogden Sewage Treatment Works to the River Thames.
5. A new outfall structure, to discharge the recycled water, would be built on the banks of the River Thames.

What is water abstraction?

Abstraction is the process of drawing water from a river, or groundwater, for drinking water and other uses.

It's crucial for maintaining water supplies, but must be carefully managed to avoid negative impacts on the environment.

Sustainable abstraction approaches, like the one we're proposing, take into account factors like a river's flow, ecology, water quality, and the potential effects on downstream areas.

Permits are required from the Environment Agency to ensure that abstraction activities do not harm the environment, disrupt natural habitats, or deplete the river's water resources beyond sustainable levels.

How much additional water could the project provide?

It would provide up to 75 million litres of additional water for London each day, enough for 500,000 people.

When would it be used?

There would be rules governing when the system could be used.

Typically, we'd only seek to use it during periods of prolonged dry weather, between late summer and late autumn, on an intermittent basis.

What is water recycling?

Water recycling is a tried-and-tested process used widely in the UK and in other countries to treat wastewater so that it can be introduced back into the environment.

The Environment Agency, together with existing legislation, determines the level of treatment that's required to ensure the environment is protected.

How would the water be treated and how clean would it be?

Typically, wastewater is piped to sewage treatment works, where it can be filtered before undergoing "primary" and "secondary" treatment to make it safe to be released back into local watercourses.

At some sewage treatment works there is a further stage, called "tertiary treatment", which we're proposing to introduce at Mogden Sewage Treatment Works as part of this project.

Tertiary treatment is used to remove tiny suspended particles from wastewater that has already undergone primary and secondary treatment, such as dissolved organic and inorganic substances, and additional contaminants.

Primary and secondary treatment get wastewater clean enough to discharge safely into the environment.

Tertiary treatment is able to achieve levels of water purification that make the water safe for reuse in water-intensive processes or, after further treatment, onward use as drinking water.

Tertiary treatment includes at a minimum:

- Coagulant dosing, a process used in water treatment to enhance the removal of suspended particles and impurities
- Treatment through Moving Bed Biofilm Reactors (MBBR) for further reduction of impurities
- Filtrations through mechanical cloth filters as a final step to further remove suspended particles and impurities

Further treatment could be required, but we're still working with the Environment Agency to establish what exactly is needed.

We understand how precious the River Thames and its surroundings are. As such, we're committed to ensuring that the Teddington Direct River Abstraction project does not cause a deterioration in the quality of the water in the river.

You can find out more about water recycling and treatment methods in our factsheets, via our website, at **www.thames-sro.co.uk/supportingdocuments**

Project update

We're continuing to prepare our proposals, and are on track to submit an application for development consent to the Planning Inspectorate in 2026.

In autumn 2023 we held a public consultation on initial site options for the project, focusing on the potential locations of new structures, tunnels and shafts.

We received over 2,000 responses and have read and considered them all, whilst re-evaluating our designs. We've now introducing several changes to our proposals, including:

- A new design and proposed construction method for the tunnel that would be used to convey highly-treated water from the new water recycling facility at Mogden Sewage Treatment Works in Isleworth, to the river
- A proposed route corridor for the tunnel
- We've removed four of the five intermediate shafts that had been proposed for various locations in Hounslow, Richmond and Kingston
- We've changed the proposed discharge location for the "sweetening flow" (a low volume discharge of highly-treated water which would be needed to help maintain the new tertiary treatment facility at Mogden Sewage Treatment Works)

You can find out more about these changes in the next section of this brochure.

Public consultation

We've published a report on last year's public consultation, which can be found on our website at:

thames-sro.co.uk/supportingdocuments

We've also published our Statement of Response document, which you can also find at:

thames-sro.co.uk/supportingdocuments

You can also request copies by emailing us at:

info.TDRA@thameswater.co.uk

or via our Customer Helpline on

0800 980 8800

We're planning to hold a further statutory public consultation on our proposals in 2025.

Community information events

We're holding a series of community information events in October, focusing on the design changes that we've made.

The events will be held in the following locations:

01 October	**Isleworth Public Hall, TW7 7BG**
05 October	**St Richards Church, TW10 7NL**
09 October	**Doubletree by Hilton, Kingston, KT2 5FJ**
14 October	**York House, TW1 3AA**

You can find out more about these events and register to attend at: www.thames-sro.co.uk/events

If you have any questions you can also email us at info.TDRA@thameswater.co.uk or contact us via our Customer Helpline on **0800 980 8800**.

- **Our Water Resources Management Plan sets out the strategic need for the Teddington Direct River Abstraction project and the government has now approved this plan**
- **Our 2023 Site Options Public consultation set out the potential locations for the key components of the project**
- **Your feedback has led to a change in tunnelling methodology, and other changes too**
- **TO COME** — **There's lots more work for us to do; the Environmental Impact Assessments will help answer your queries about the impact the project might have and how we'll seek to avoid, reduce and mitigate those impacts and you'll have the opportunity to provide your feedback in our statutory consultation planned for 2025**

About the 2023 public consultation

We held community events

over 743 people attended

We received:

2,312 responses

26 written

2,286 online

Changes to our proposals

We've made several changes to our proposals that would significantly reduce the impacts of future construction works for local communities.

A larger tunnel and different tunnelling method

We've increased the diameter of the proposed new tunnel linking Mogden Sewage Treatment Works and an outfall point on the River Thames – from 1.8m to 3.5m (internal dimensions). This change offers some key advantages:

- We can use a tunnel boring machine, which is a quicker way of building the new tunnel, shortening any disruption caused by construction
- We can reduce the number of intermediate surface-to-tunnel shafts that would be needed, meaning fewer construction sites, less impacts on recreation areas and open space, and greatly reduced construction impacts

There is more about our tunnelling proposals in the next section of this brochure.

Fewer intermediate shafts

We've removed most of the intermediate shafts that we were previously proposing. This would significantly reduce the impacts of future construction works to build the project, including much less impact on public and recreation spaces.

The following intermediate shafts have been removed from our designs:

- Shaft 1 Ivybridge Retail Car Park in Isleworth
- Shaft 2 Moormead and Bandy Recreation Ground in St Margarets
- Shaft 4 adjacent to the playground off Riverside Drive in Ham
- Shaft 6 to the west of Riverside Drive on Ham Lands

A single intermediate shaft would still be needed for tunnel ventilation, maintenance and emergency access. Our preferred location for this shaft is at Ham playing fields but we have retained Ham Street Car Park as a preferred alternative. A final decision will be made on the location of the shaft following our upcoming ground investigation work.

Tunnel route corridor

We've identified a corridor between Mogden STW, where the new water recycling facility would be built, and the river, within which the new main tunnel for the project would be built, shown on page 13 of this brochure. At present the route corridor, as shown, is much wider than the tunnel would ultimately be.

We'll publish a more detailed tunnel alignment next year once we've engaged further with local stakeholders and carried out ground investigation works to learn more about the local geology and possible underground obstructions.

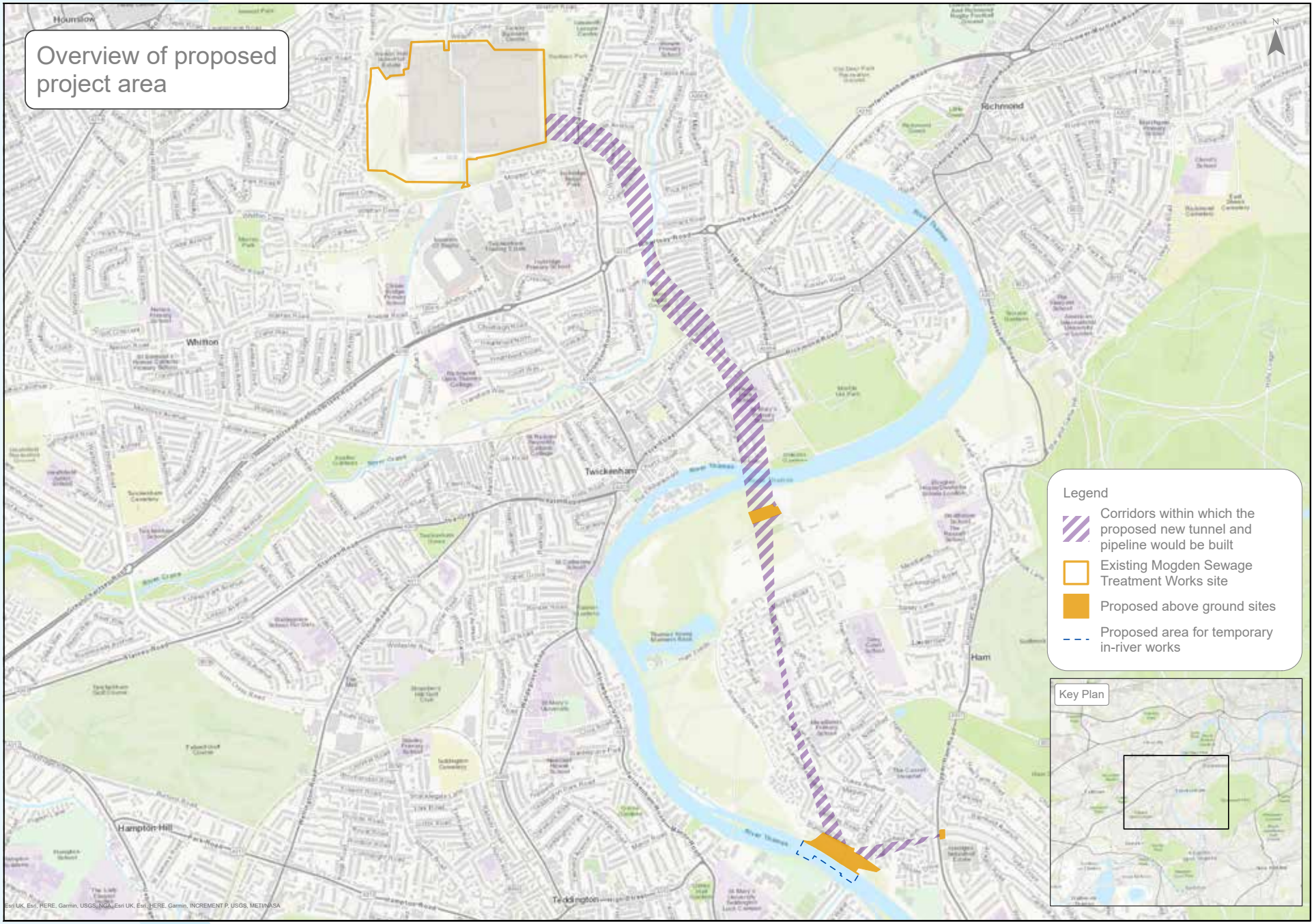
We've published a map book which is available on our website, at: **thames-sro.co.uk/supportingdocuments**

Maintenance flow

To keep the infrastructure in good working order when not in use (i.e. outside of times of prolonged dry weather), we'd run water through it at a low volume, called a "sweetening flow".

Whereas previously we'd intended this sweetening flow to be discharged through the new tunnel into the River Thames, we're now proposing to discharge at an existing outfall on the River at Isleworth Ait.

Even though we're proposing that the tunnel size be increased, the amount of recycled water that we'd be sending through it remains unchanged – up to 75 million litres per day. This is set out in our Water Resources Management Plan, which has recently been approved by the Secretary of State for the Department for Environment, Food and Rural Affairs.


Overview of proposed project area
Hounslow
Richmond
Whitton
Twickenham
Ham
Hampton Hill
Teddington
River Thames
River Crane
Legend
Corridors within which the proposed new tunnel and pipeline would be built
Existing Mogden Sewage Treatment Works site
Proposed above ground sites
Proposed area for temporary in-river works
Key Plan
N
Esri UK, Esri, HERE, Garmin, USGS, NGA, Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA

Tunnelling

We're proposing to create a new 4km long tunnel from our new water recycling facility, which would be installed at Mogden Sewage Treatment Works in Isleworth, to a reception shaft close to the River Thames in Ham.

The tunnel would be deep underground – between 20m and 30m in most places – with a 3.5m internal diameter, and created using a tunnel boring machine (TBM).

Launched from Mogden Sewage Treatment Works in Isleworth, the TBM would have a rotating cutting-head and be propelled forwards by hydraulic jacks.

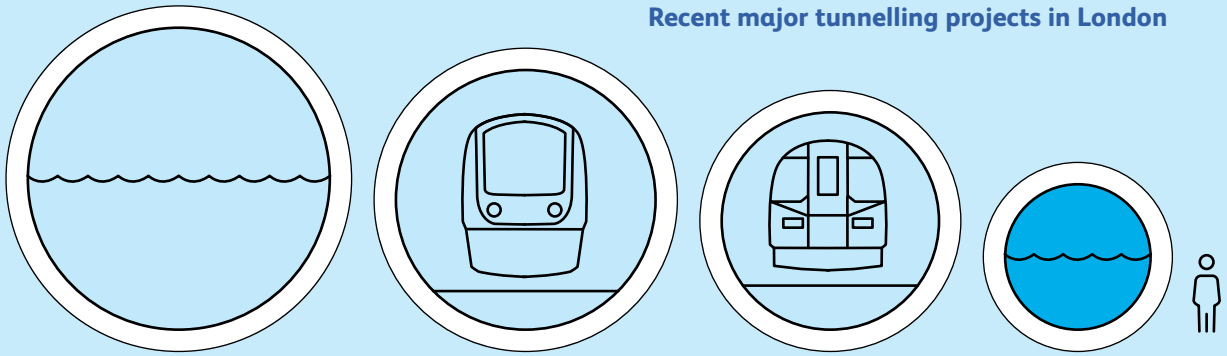
Pre-cast concrete segments would be installed by the TBM as it progresses, to line and brace the new tunnel walls, with excavated material being transferred back down the tunnel using a conveyor system.

TBMs are very good for limiting disturbance to the surrounding rock making them particularly suitable for tunnelling in urban environments, avoiding ground movements and damage to land and property on the surface.

Controlling ground movement

TBMs are tried and tested technology, and are used regularly in London, with several recent examples including the Elizabeth Line, the Thames Tideway and Northern Line Extension to Battersea.

Recent major tunnelling projects in London



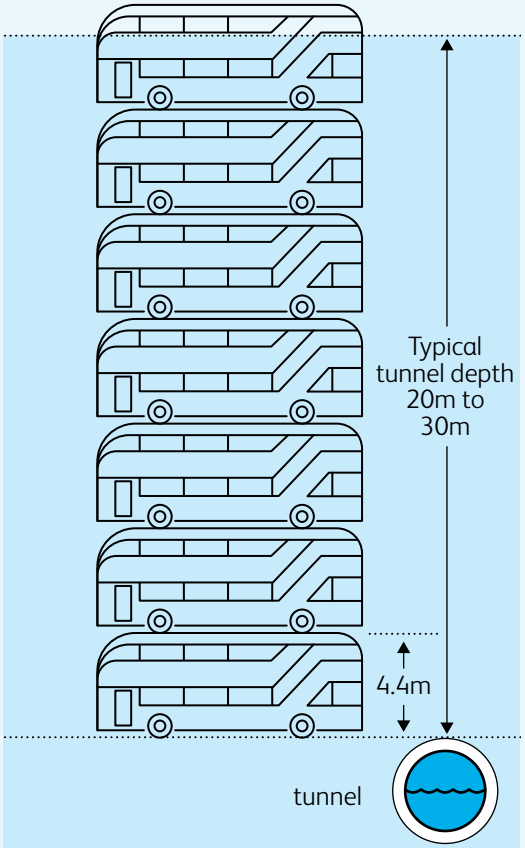
Thames Tideway tunnels
7.2m internal diameter
completed in 2023

Elizabeth Line tunnels
6.2m internal diameter
completed in 2015

Northern Line Extension tunnels
5.2m internal diameter
completed in 2017

Main Teddington Direct River Abstraction tunnel 3.5m internal diameter

Approximate depth of the main Teddington Direct River Abstraction tunnel



We've identified a corridor within which the tunnel would be built. This corridor (which you can see on page 13), is currently much wider than the actual tunnel would ultimately need to be, so, even if you live in or own a property within the route corridor as shown, it doesn't mean that the tunnel would be built directly beneath it.

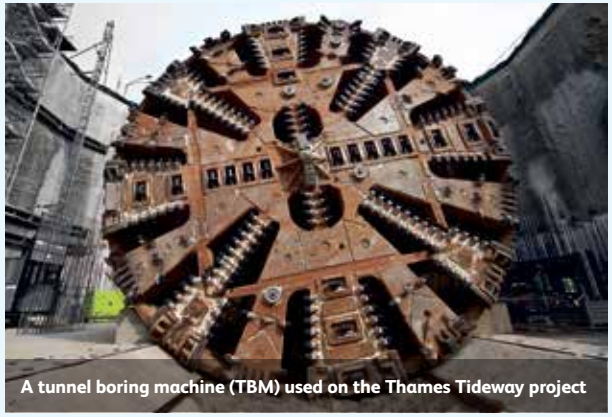
We'll publish a more detailed tunnel alignment next year once we've engaged further with local stakeholders and carried out ground investigation works.

In any case, it's highly unlikely that the construction of the new tunnel would have any significant impact on the properties above because the depth of the tunnel (20-30m) would greatly reduce the risk of any impacts.

There are also many things that could be done to prevent tunnel "settlement" (causing movements of the ground) and property damage.

Preventing ground settlement and protecting properties

- We will seek to carry out **detailed ground surveys and settlement assessments, as well as property surveys** where appropriate, to ensure that the tunnelling methods we use could avoid or mitigate any ground settlement
- We'd most likely use an **earth pressure balance TBM**, designed to balance earth and water pressures and support the face of the tunnel excavation during tunnelling. Earth pressure balance TBMs are often used for soft ground tunnelling in urban areas
- If needed, we'd use **jet-grouting** before, during and/or after tunnelling works, to reinforce the ground and provide extra stability
- **Interlocking concrete segments** would be placed to line and brace the tunnel as it is being excavated by the TBM
- We'd carry out **real-time monitoring** of the tunnel lining, the surrounding ground and property on the surface, to instantly detect any small movements of the ground
- Well in advance of any tunnelling, we'd seek to undertake **defect surveys** of properties, where appropriate, to record their pre-tunnelling condition, so that changes caused by tunnelling works (e.g. hairline cracks) could be identified and, if needed, addressed



A tunnel boring machine (TBM) used on the Thames Tideway project

Managing excavated material

Excavated material from the tunnel would be transferred back down the tunnel using a conveyor system, to a temporary storage site at Mogden Sewage Treatment Works, from where it would be loaded into trucks and transported via the strategic road network, avoiding local roads where possible.

You can find out more about our tunnelling proposals by:

- Watching our tunnelling animation on our website, via: **thames-sro.co.uk/TDRA**
- Reading our tunnelling factsheet, at: **thames-sro.co.uk/supportingdocuments**
- Coming to one of our community information events, which are listed in the Project Update section of this brochure, and online, at: **thames-sro.co.uk/events**
- Alternatively, you can email us at: **info.TDRA@thameswater.co.uk**
- or call our Customer Helpline on: **0800 980 8800**

New intake and outfall structures

Intake and outfall structures would be built upstream of Teddington Weir, so that water could be taken from the River Thames and be replaced by recycled water.

Intake structure

The new intake structure would be built upstream of Teddington Weir and would consist of a screening structure and supporting equipment, built into the river bank, and also extending into the river.

To build it, a temporary cofferdam (an enclosure built within a body of water to allow the enclosed area to be pumped out or drained) would be extended from the riverbank into the river to create a dry worksite.

It's expected that construction of the intake and outfall structures would take around 21 months.

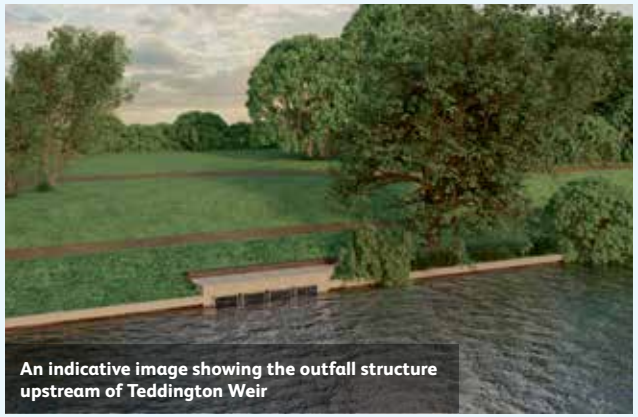
An indicative image showing the intake structure upstream of Teddington Weir

Outfall structure

The outfall structure would be smaller and more discreet than the intake structure and located 150m downstream from the abstraction facility.

A temporary cofferdam would also be needed to build the outfall point. Once built, surrounding land would be reinstated and diverted footpaths on the riverbank reopened.

Our plans for the project do not allow for the discharge of storm overflow during periods of heavy rainfall or untreated wastewater or sewage into the River Thames. The design will allow for only recycled water treated in the tertiary treatment facility to pass through the new tunnel, and then be discharged into the River Thames via the outfall structure upstream of Teddington Weir.



An indicative image showing the outfall structure upstream of Teddington Weir

Next steps

We've got lots more work to do before seeking planning consent for the new water recycling project.

Further public consultation and stakeholder engagement

We're planning to hold a statutory public consultation on our proposals in 2025.

Before then, we'll publish a Statement of Community Consultation, explaining how we'll consult and work with local communities.

Environmental surveys

We're working hard to develop our proposals so that they avoid, mitigate and reduce negative environmental impacts wherever possible.

To start with, it's important that we build a detailed understanding of the local environment, and how it changes through the seasons, so that we can predict the potential impacts of our proposals and adjust them as needed.

We're carrying out surveys to monitor local wildlife, assessments of river flow and velocity, detailed habitat surveys to identify and protect local ecosystems, and the use of riverbed sonar to map underwater topography. These will help to ensure that we fully understand the environmental context of our proposals, so that we can develop designs to avoid, reduce or mitigate impacts.

Tertiary water treatment pilot study

We're carrying out a pilot study on the water treatment technology that could be used to remove wastewater pollutants at Mogden Sewage Treatment Works.

The study will run for between 12 and 18 months and provide real-world data about the effectiveness of what we're proposing.

You can find out more about the proposed water treatment technology in our factsheet, on our website at **www.thames-sro.co.uk/supportingdocuments**

Environmental impact assessment

We're carrying out an Environmental Impact Assessment (EIA), to record what the environment is like now, with a detailed assessment of how our proposals would change it, and proposals for how we'd deal with these changes, such as putting in place appropriate environmental mitigations.

Typically, an EIA considers a broad range of environmental factors including:

- Landscape and Visual
- Ecology
- The Water Environment
- Soils and Geology
- The Historic Environment
- Noise and Vibration
- Air Quality
- The Community
- Materials and Waste
- Traffic and Transport
- Climate
- Cumulative effects

The Environmental Impact Assessment process

2024

EIA Scoping Report

We'll submit an EIA Scoping Report to the Planning Inspectorate (PINS), setting out the scope and environmental assessment methods that we propose to use. PINS will consult with statutory bodies and provide a Scoping Opinion – the basis of our subsequent work.

2025

Preliminary Environmental Information

Our preliminary environmental information will identify likely significant environmental impacts and how we might mitigate them.

2026

Environmental Statement

The outcome of the EIA will be published in an Environmental Statement, which will be submitted to PINS as part of our application for development consent.

Ground investigation works

We'll start carrying out ground investigations surveys this autumn, extracting soil and rock samples from boreholes (narrow shafts bored into the ground) and small trial pits, to gather detailed information about local ground conditions.

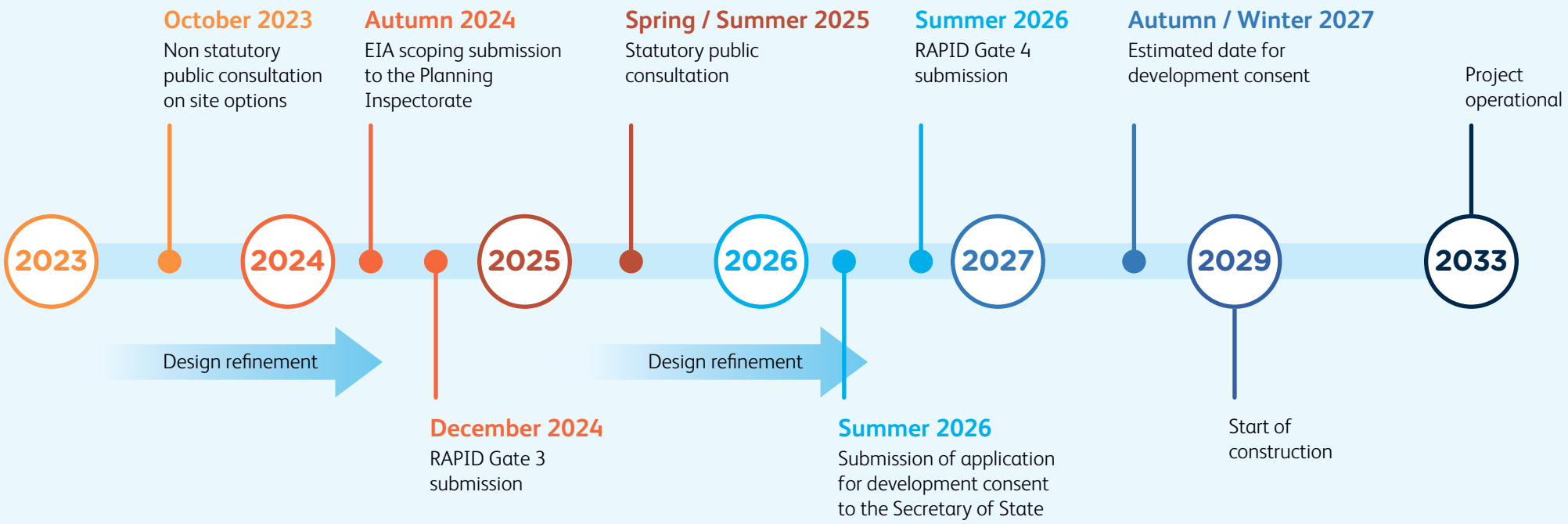
This will help to inform various parts of our design work, including the exact alignment of the proposed new tunnels.

You can find more information about our ground investigation programme by visiting our website, at **www.thames-sro.co.uk/tdra**

Developing our designs

We'll continue to develop our designs, informed by ongoing engagement and public consultation, with a statutory public consultation planned for 2025.

Project timeline



Seeking the powers to build the project

Because the Teddington Direct River Abstraction project is a project of national significance we're preparing an application for development consent which we plan to submit to the Secretary of State for the Environment, Food and Rural Affairs in 2026.

If the application is accepted, the Planning Inspectorate will consider it and hold an examination, before writing a report with its recommended decision. The final decision would be made by the Secretary of State for Environment, Food and Rural Affairs.

If granted, the Development Consent Order would provide many of the necessary consents and powers to enable the project to proceed, including consent to build, operate and maintain the new infrastructure and the ability to acquire temporary and permanent rights over land.

Thames Water Clearwater Court Vastern Road Reading RG1 8DB