Lower Roding Water Quality
Dry Weather Report 2025

The Lower Roding Water Quality project is a collaboration between Thames21, the River Roding Trust, and Thames Water

Prepared by Aggie Hodges & Jack Beard, Thames21 & Paul Powlesland, River Roding Trust

Contents

Executive Summary

Summary of Work

This report presents the findings of the dry weather monitoring phase of the Lower Roding Water Quality project – a collaboration between Thames21, the River Roding Trust and Thames Water, with involvement from the Environment Agency and Redbridge Council. The project was funded by Thames Water through their Catchment Partnership Support Fund (CaPS).

Between May and October 2025, the project monitored over 70 outfalls on the lower Roding and its tributaries using extended citizen science methods: spot sampling for ammonia, phosphate and bacteria; flow estimation; accredited laboratory analysis of faecal indicator organisms; and eDNA analysis. A key innovation was combining flow measurements with ammonia concentration data to calculate ammonia loading (kg/year) at each outfall, providing an objective basis for comparing and ranking pollution sources by their total impact on the river.

Identification of Priority Outfalls

Through quantitative analysis of ammonia loading across all monitored outfalls, six were identified as likely the most polluting sources on the lower Roding:

- Cranbrook at Confluence (1,977 kg ammonia/yr)
- Royston Gardens (669 kg/yr)
- Outfall near Aldersbrook Confluence (513 kg/yr)
- Roding Lane South Substation (447 kg/yr)
- Uphall Rec (213 kg/yr)
- Ilford Hill Bridge (139 kg/yr)

All six regularly exceeded Water Framework Directive (WFD) 'Bad' classifications for ammonia during dry weather. At five of the six, average ammonia values were above 5mg/l; communications with Thames Water's network team have confirmed that this is indicative of major asset failure or acute misconnection. Phosphate values were also consistently 'Bad' at every priority outfall. At Uphall Rec, Ilford Hill Bridge and Aldersbrook, individual ammonia readings exceeded the WFD 'Bad' threshold by a factor of ten or more on six occasions.

Key Findings and Outcomes

Simple citizen science methods are effective for identifying and tracing sewage pollution sources on the Roding. Measuring flow alongside ammonia concentration was critical to understanding true impact: some outfalls with high ammonia but low flow contributed less overall pollution than expected, while others with moderate concentrations but high volumes would have been overlooked without flow data.

In dry weather, this analysis shows that the Cranbrook tributary is the most significant pollution source on the Lower Roding – nearly three times the next worst outfall and ranking among the most polluted tributaries in London (when benchmarked against Thames21's citizen science data[1]). Investigation confirmed two sources: sewage from chronic misconnections across the tributary, with eDNA analysis identifying human faecal contamination; and landfill leachate from Fairlop Waters Country Park, where poor or absent capping is likely driving elevated ammonia[2].

Several priority outfalls are not simple surface water outfalls but historic buried tributaries now carrying significant and continuous pollution loads. Faeces, toilet paper, cooking fat and rag were recorded at multiple sites. Four of the six – the Cranbrook, Aldersbrook, Uphall Rec and Ilford Hill Bridge – are clustered within a short stretch, making it the most sewage-impacted section of the entire river, in an area of high public access and population density.

As a result of this investigation, the Cranbrook, Aldersbrook, and Ilford Hill Bridge outfalls have been placed on Thames Water's Surface Water Outfall Programme (SWOP) list. SWOP is a targeted programme of work to address outfalls believed to be impacted by misconnection. It should be noted that misconnections remain an ongoing issue, as new appliances can be installed without any requirement for drainage checks.

An early project success was the elimination of dry weather pollution at Winn Valley Pumping Station, where findings shared with Thames Water led to the installation of a pump that reduced ammonia values to 0 mg/l – demonstrating the collaborative approach can deliver rapid results.

Figure 1: One of the only open air sections of the Cranbrook, close to the confluence showing visual evidence of pollution

---

[1] https://www.thames21.org.uk/citizen-science-dashboard/
[2] Determined via communication with Redbridge Council

Recommendations

- Thames Water Surface Water Outfall Programme (SWOP) investigations should immediately be expedited in the surface water catchments feeding into the Cranbrook, given the evidence laid out in this report demonstrating the impact of misconnections affecting the entire Cranbrook tributary. Improvement of the Cranbrook tributary should be prioritised as a matter of urgency to address the pollution impacts being caused to the lower Roding from this tributary. This should include the implementation of nature-based solutions, including:
    - Daylighting of the river and the implementation of natural treatment systems on the site south of Fairlop Waters Country Park. This has been identified as a suitable site to treat water quality pollution deriving from landfill leachate and residential properties (see section 4.1.4*)*.
    - Re-naturalisation of the Cranbrook through Valentine's Park, to reduce the continued human faecal contamination of the tributary, restoring its natural processes and ability to treat some of the water quality pollution. Constructed treatment wetlands at Valentine's Park would provide a further nature-based solution to improving water quality but may not be feasible due to cost, and health and safety concerns around public access.
- Restoration of the Cranbrook should be supported by Redbridge Council and Thames Water, to reflect the joint ownership of assets and pollution sources.
- Landfill leachate coming from Fairlop Country Park should be investigated further to understand the potential chemical pollutants being emitted, and the pollution remediated by capping or by another means necessary to reduce any flow into the Cranbrook tributary.
- SWOP investigations should be expedited at Uphall Rec, Royston Gardens, and the Aldersbrook. Regular meetings established between Redbridge Council and Thames Water to ensure actions are undertaken timely (see roadmap, Table 1).
- Nature-based solutions (NbS) should be considered in the remediation of pollution inputs into the Roding wherever feasible.
- Continued collaboration between Thames Water, the Environment Agency, Redbridge Council and local NGOs such as the River Roding Trust and Thames21 will help sustain improvements to the Roding and its tributaries' health and encourage local communities to engage with their local river in the knowledge that responsible parties are actively working to make it a safe river to access.
- Creation of a cross-organisational misconnections task force in Redbridge.
- Continued citizen science monitoring of these problem outfalls and tributaries to ensure rectification and provide evidence for success of remediation.
- The roll-out of the collaborative approach and techniques used in this monitoring programme to other catchments in London.

Roadmap for Action

Table 1 sets out the proposed actions required to address pollution at the six priority outfalls identified in this report. Each action is assigned a lead organisation and a priority rating (high, medium or low) for each outfall, reflecting the severity of pollution, the current status of investigations, and the urgency of intervention. The Cranbrook is rated as high priority across nearly all actions, reflecting its status as the single largest pollution source on the lower Roding.

Table 1: Key actions to be progressed per outfall identified in this report.

Proposed Action	Lead	Cranbrook	Royston Gardens	Roding Lane South	Aldersbrook	Uphall Rec	Ilford Hill Bridge
Continue existing SWOP investigations	*Thames Water*	HIGH	MEDIUM	MEDIUM	—	—	—
Commence new SWOP investigations	*Thames Water*	—	—	—	HIGH	HIGH	HIGH
Repair faulty assets / enforce rectification of misconnections[3]	*Thames Water / Redbridge*	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
Post-remediation monitoring to confirm success	*EA / Thames21*	HIGH	MEDIUM	HIGH	HIGH	HIGH	MEDIUM
Deploy EA monitoring (sondes, spot samples) to further investigate pollution	*EA*	HIGH	MEDIUM	MEDIUM	HIGH	HIGH	HIGH
Investigate leachate sources on the Cranbrook and remediate	*Redbridge*	HIGH	—	—	—	—	—
Progress nature-based solutions (e.g. wetlands, daylighting of surface water drains)	*Redbridge*	HIGH	MEDIUM	—	—	MEDIUM	—
Long-term continuous monitoring for emerging failures	*TW / Thames21*	MEDIUM	LOW	MEDIUM	MEDIUM	MEDIUM	LOW

Key: HIGH = immediate action required MEDIUM = action required in short-medium term LOW = ongoing / long-term — = not applicable.

[3] Note that it is Thames Water's responsibility to locate misconnections, but the local authority's responsibility to enforce if households have not put in place appropriate mitigation.

1 Background

1.1 Context

The River Roding is London's third largest river, flowing from rural Essex and joining the Thames at Barking Creek. This project encompasses the urban lower section of the Roding and its tributaries (see **Figure 2**).

Despite numerous environmental threats and pressures affecting the Roding and its tributaries, they continue to provide important habitats for a variety of wildlife, and some stretches host healthy freshwater flora ecosystems.

Until recently, very little monitoring had been undertaken on the Lower Roding. The Lower Roding's latest statutory classifications were 'Moderate' for ecological status and 'Poor' for chemical status[4]. In 2023, the Roding was recorded to have suffered 237 sewage spills, the second highest number in any London river after the Thames[5]. Thames21-led citizen science bacteria monitoring in 2024 confirmed that sewage pollution was negatively affecting water quality in the lower Roding, with all seven sample points failing to meet bathing water sufficient standards [6]. It is important to note, there are no bathing water designations on the River Roding, however the bathing water standards are used in this report to give a measure of the microbiological state of the river. Following this monitoring programme and increased awareness of pollution issues faced by the Roding thanks to Thames21, River Roding Trust and Redbridge Council, it was clear that further investigations were needed to understand the scale and impact of pollution both on the main river and its tributaries. The Lower Roding Water Quality monitoring project was therefore conceived as a collaboration between River Roding Trust, Thames21 and Thames Water, with continued involvement from the Environment Agency and Redbridge Council.

1.2 Objectives

The main objectives of this project were the following:

- Identify and rank the most polluting outfalls and Combined Sewer Overflows (CSOs) on the lower Roding.
- Work collaboratively with partners to undertake the research and share findings
- Suggest solutions for these pollution issues including nature-based solutions where possible.

[4] Environment Agency - https://environment.data.gov.uk/catchment-planning/WaterBody/GB106037028181
[5] According to Thames Water EDM data for 2023
[6] Thames21 - https://storymaps.arcgis.com/collections/4bb4dcb61b36411686e82362987c42bf?item=6

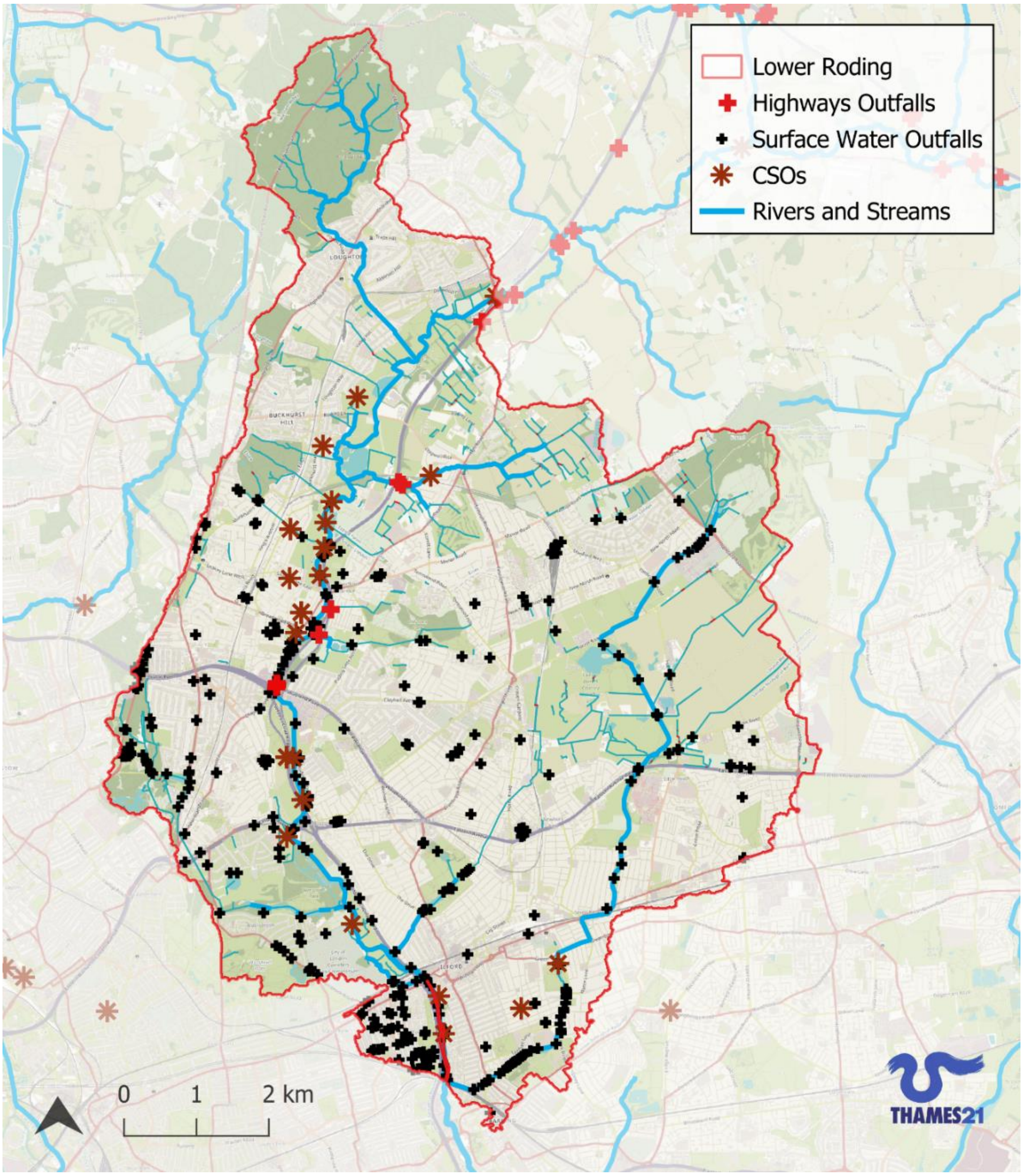


Figure 2: Map depicting monitoring boundary and inputs (source: Thames21)

2 Methodology

2.1 Identification and Visual Inspection of Outfalls

Monitoring was undertaken on the Lower Roding between May – October 2025. The first phase of the project involved a comprehensive walkover survey of outfalls on the lower Roding recorded in Thames Water's mapping data. These surveys, conducted by the River Roding Trust, confirmed on-the-ground locations, assessed physical condition, and noted visual indicators of pollution such as discolouration, opacity, sewage-derived litter and odour. This ground-truthing was essential: mapped locations did not always match what was found on site, and the surveys identified outfalls clearly discharging in dry weather.

Data from ZSL's Outfall Safari programme[7] was also used to prioritise key locations for further monitoring. Together, the visual inspections and desk-based review informed the selection of sites for regular monitoring over the dry weather period.

2.2 Water Quality and Flow Monitoring

Following initial site walkovers, a long list of around 70 outfalls for further monitoring was created, with these being tested for ammonia and phosphate. This helped further prioritise a shortlist of around 20 outfalls which were more regularly tested by this project.

This monitoring involved:

- Spot sampling to establish baseline pollution levels on the main river & tributaries
- Dry weather spot sampling at outfalls
- Upstream and downstream sampling of pollution inputs (downstream samples taken 10x width of river at input, upstream samples taken 2x width of river at input)
- Additional evidence recording such as photos, videos and descriptions
- Environmental DNA (eDNA) analysis and quantitative polymerase chain reaction (qPCR)
- Road run-off sampling and analysis

For a full description of parameters monitored and the respective instrumentation used to measure these, see Table 2.

2.2.1 Extended Citizen Science Methods

Citizen Science methodologies were used to monitor a range of parameters. Citizen science methods are a cost-effective method to monitor more frequently and at a higher resolution (the CaSTCo[8] initiative has described this as 'tiers of evidence'). Monitoring was undertaken on average once weekly, though due to equipment resourcing issues, not all parameters were tested at each observation.

[7] Zoological Society of London - https://cms.zsl.org/sites/default/files/2025-09/ZSL00412%20The%20Rivers%20Trust%20Outfall%20Safari%20Guide_A5_V5.pdf
[8] https://castco.org/

2.2.1.1 Flow

To estimate flow a container of known volume was held beneath each outfall and the time taken to fill it was recorded using a stopwatch (see Figure 3). Flow rate was then calculated as litres per minute by dividing the container volume by the fill time. This method is well-suited to citizen science monitoring programmes. While it is subject to some variability depending on outfall accessibility and form of discharge, it provides a practical basis for comparing relative flow rates across sites – and when combined with ammonia concentration data, enables the calculation of ammonia loading estimates for the prioritisation of outfalls in this report.

Figure 3: Still from a video of the flow measurement methodology using a bucket at the outfall.

2.2.1.2 Hanna Checkers

Hanna checkers are handheld colorimeters that work via detecting changes in colour resulting from the addition of a reagent to a water sample. These were used in this project to measure Ammonia[9] and Phosphate levels in water. Thanks to the affordability and rapidity of Hanna Checker sampling, quick observations could be conducted to establish baseline dry-weather pollution levels and identify possible sources of pollution.

Comparison studies of accuracy of Hanna Checkers against lab results have evidenced high levels of reliability and accuracy (Thames21 report detailing this available upon request).

Table 2: Monitoring parameters, instruments & standards

Parameter	Instruments	Standards

[9] Ammonia Hanna checkers measure Total Ammoniacal Nitrogen, not NH3 / Free Ammonia. For more information see Annex A.

Total Ammonia Nitrogen (TAN)	-HI-715 Ammonia Medium Range Checker for Freshwater -HI-733 Ammonia High Range Handheld Colorimeter (0.0-99.9ppm) Checker HC	Water Framework Directive Classifications
Phosphate / PO4	-HI-713 Phosphate Low Range Checker for Marine and Freshwater -HI-717 High Range Phosphate Colorimeter - Checker HC	Water Framework Directive Classifications
Flow	Bucket & timer	
E coli	Accredited lab analysis (Mercian Science): membrane filtration method	Bathing Water Regulations Classifications
Intestinal Enterococci (IE)	Accredited lab analysis (Mercian Science): membrane filtration method	Bathing Water Regulations Classifications
eDNA	Applied Genomics qPCR using E. coli and Intestinal Enterococci assays	Applied Genomics thresholds

2.2.2 Additional Methods

2.2.2.1 Faecal Indicator Organism (FIO) monitoring

Mercian Science's accredited laboratory was chosen for analysis of the two bacteria: E. coli and Intestinal Enterococci. Colilert tests were undertaken on 1ml samples, increasing our limit of detection to 242000 MPN/100ml for E. coli and 20,000cfu/100ml for Intestinal Enterococci. Though less accurate, this method was chosen because in previous bacteria sampling projects on this section of the Roding, E. coli values regularly exceeded detection limits. Using this testing method, we were able to estimate extremely elevated bacteria levels.

2.2.2.2 eDNA monitoring

Seneye Sensors, in collaboration with Applied Genomics, offered in-kind eDNA analysis on the Cranbrook tributary. Using the eDNA Water Sampling kit, samples were extracted for DNA and DNA concentrations were quantified using Qubit Fluorometry. Quantitative polymerase chain reaction (qPCR) was also undertaken using Applied Genomics equipment and laboratory.

2.2.2.3 Road run-off sampling and analysis

Road runoff sampling was intended for this project, but due to unfavourable weather conditions making it difficult to capture first flush readings, and the high cost of analysis, this element was not included. It is possible, however, that road run-off analysis will be incorporated into Roding Rises National Lottery Heritage Funded Project which kicks off in January 2026.

2.3 Monitoring Locations

Monitoring was undertaken within the region and at the sites specified in Figure 5.

We identified sites for regular monitoring by numerous walkovers and visual checks / one off ammonia measurements. Sites that showed clear visual evidence of pollution and high ammonia readings were prioritised for continuous (weekly) monitoring.

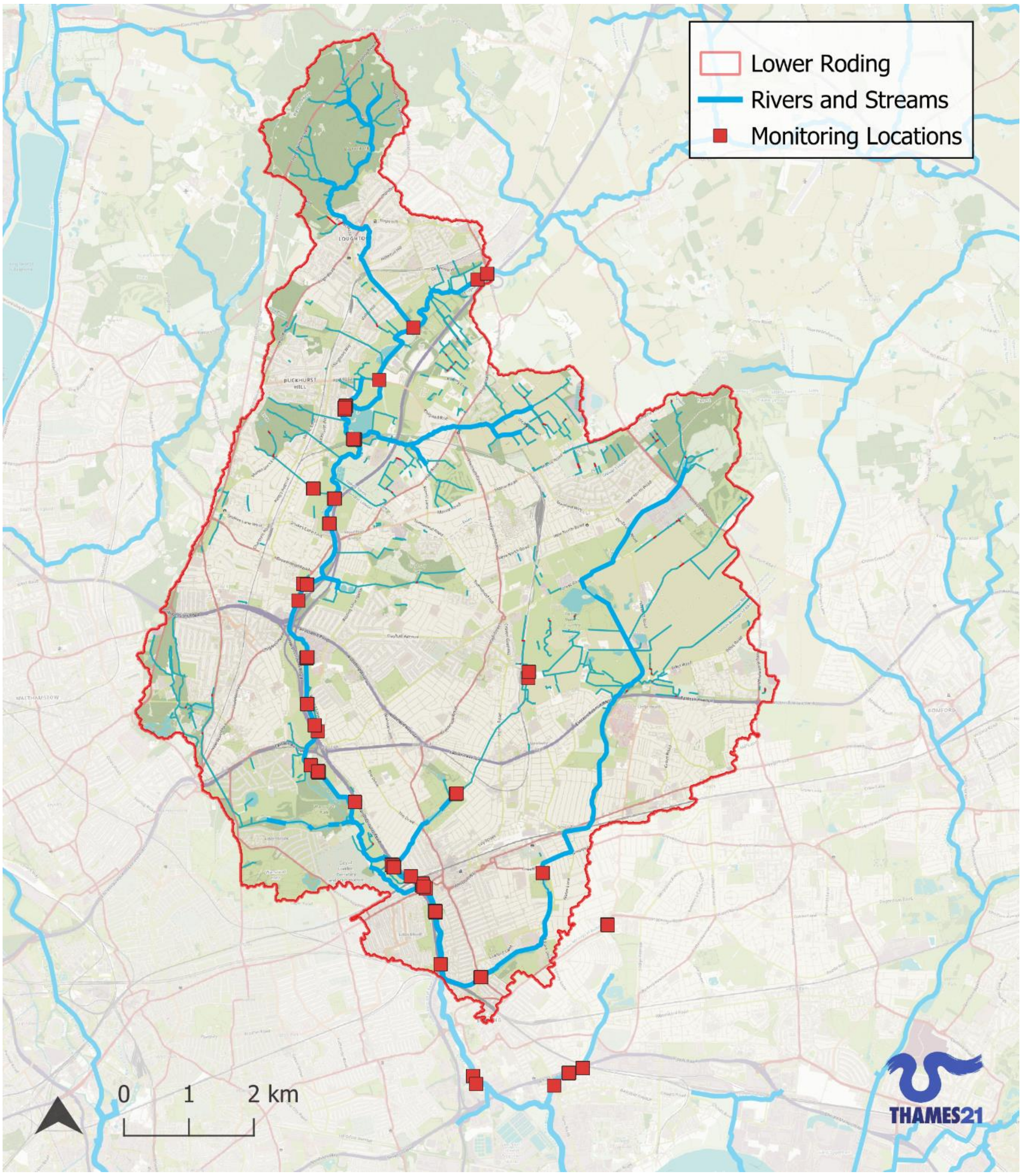


Figure 5: Map depicting monitoring boundary, sampling points and pollution inputs (source: Thames21)

2.4 Water Quality Standards

To provide context to the data, WFD thresholds were used to classify the relative values for different parameters. WFD is the legal and management framework used to protect and improve the ecological and chemical status of all water bodies through River Basin Management Plans and environmental standards. Applying this threshold allows for interpretation of the data in the context of wider results.

For Ammonia and Phosphate, thresholds used for classification are presented in Table 3. These are WFD classifications for Ammonia and Phosphate, created using analysis conducted by Thames21 on catchments across London and their respective physical characteristics.

Table 3: Water Framework Directive standards: Ammonia & Phosphate (source: Water Framework Directive (2000/60/EC) & Thames21[10].

WFD Classifications	Ammoniacal Nitrogen NH3-N (mg/litre)	Phosphate PO4 (mg/litre)
	90th Percentile	Average Concentration
Very Good	<0.3	<0.15
Good	0.3-0.6	0.15-0.26
Moderate	0.6-1.1	0.27-0.63
Poor	1.10-2.5	0.64-3.30
Bad	>2.5	>3.30

Bathing water classifications are laid out in the Bathing Water Regulations (2013) and are informed by recommendations by the World Health Organisation (WHO) regarding human health. The Roding is not a designated Bathing Water so these standards are used to provide additional context. Water quality at designated bathing water sites in England are assessed by the Environment Agency. From May to September, samples of two different types of bacteria which may be harmful to human health are taken to measure water quality, and at a number of sites daily pollution risk forecasts are issued. Annual ratings classify each site as excellent, good, sufficient or poor based on measurements taken over a period of up to four years, with a minimum of 16 samples required to make a classification[11].

Table 4: Bathing Water Standards (source: Bathing Water Directive (2006/7/EC)).

Parameter	BW status	CFU/100ml[12]	Percentile
Enterococci	Excellent	200	95
	Good	400	95
	Sufficient	330	90
	Poor	>330	90
E.Coli	Excellent	500	95
	Good	1000	95
	Sufficient	900	90
	Poor	>900	90

Table 5: eDNA Bacteria thresholds used by applied Genomics

Unsafe	DNA copies/100 mL exceed the equivalent of the "Poor" CFU threshold.
High	DNA copies/100 mL are 90–100% of the "Poor" CFU threshold.
Elevated	DNA copies/100 mL are 10–90% of the "Poor" CFU threshold.
Trace	DNA copies/100 mL are between 0.1–10% of the "Poor" CFU threshold.
Not Detected	0 DNA copies/100 mL detected.

[10] Full report available upon request.
[11] Environment Agency - https://environment.data.gov.uk/bwq/profiles/
[12] Colony forming units per 100 ml

3 Results

3.1 Analysis of results

3.1.1 Ammonia Loading Calculations

Ammonia loading is used as a metric to estimate the total input of Ammonia to the Roding derived from each outfall, in kilogrammes per year. This metric allows for comparison across different outfalls – and even between outfalls and CSOs. It is calculated by multiplying ammonia readings by daily flow estimates as such:

$$Ammonia\ Loading\ \left[\frac{kg\ TAN}{year}\right] = Ammonia\ Concentration\ \left[\frac{kg\ TAN}{litre}\right] \times Flow\ \left[\frac{litre}{day}\right] \times Days\ Discharging\ \left[\frac{days}{year}\right]$$

Given the flow calculation method used was liable to subjectivity, flow estimations are not expected to be accurate; rather, they are an approximate calculation used primarily for comparison of pollution rates and consequent prioritisation. All outfalls in Table 6 were discharging during both dry and wet weather, so to calculate yearly ammonia input into the River Roding, average daily ammonia load was multiplied by 365.

These estimates will in some cases be an underestimation, given that on some sample dates a medium-range Hanna checker was used, giving maximum readings of 9.99ppm. On sample dates where a high-range Hanna checker was used, many readings exceeded this range. Samples in general were collected in the daytime (between 9am and 7pm) and in the period covering May to October; as such these may not cover some of the seasonal or diurnal variability in the levels of pollution coming from outfalls. It is likely that concentrations from outfalls will vary significantly through the year so further studies could help better understand this dynamic.

3.2 Identification of Priority Outfalls

To rank and compare outfalls objectively, ammonia loading (kg/yr) was used as the primary metric, calculated by multiplying ammonia concentration by flow rate estimates at each outfall (see section 3.1.1 for methodology). This approach was chosen because ammonia concentration alone does not capture the full impact of an outfall on the river — an outfall with moderate ammonia but high flow can contribute more total pollution than one with high ammonia but low flow (see this demonstrated in Figure 6).

Outfalls were ranked from highest to lowest estimated ammonia loading, and the six worst-performing were selected for detailed analysis in the outfall deep dives (section 4). These six were selected on the basis that they represented the most significant dry-weather pollution sources identified by this investigation, with estimated loadings substantially higher than the remaining outfalls monitored (Table 6). All six were discharging continuously in dry weather and consistently show high bacterial concentrations.

It is important to note that these rankings are based on the data collected during this programme and are subject to the uncertainties outlined in section 3.3.1. They represent the best available evidence from this investigation rather than a definitive account of all pollution sources on the lower Roding.

Winn Valley Pumping Station was identified as a regular input of ammonia pollution into the river Roding, with an average of 3.1 mg/l during dry weather periods. These findings were flagged to Thames Water, a team was sent out to investigate, and in September 2025 a six-inch 3 pump was installed to pump water back into the foul network. This will act as a semi-permanent mitigation for dry weather only, as high flows will cause back-ups. During subsequent dry weather, ammonia values at Winn Valley Pumping Station reduced to 0mg/l, signifying an early success of this programme.

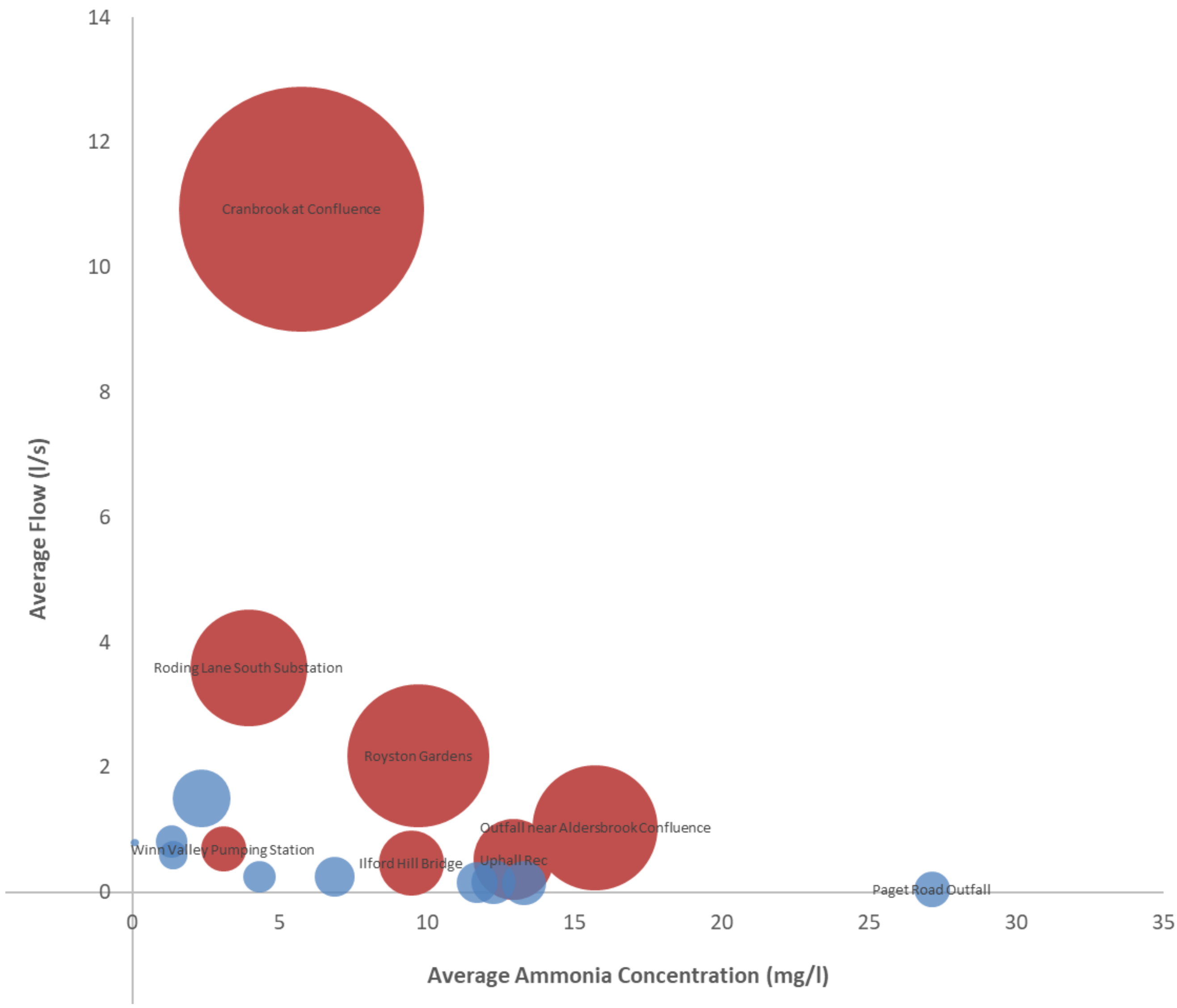


Figure 6: Relationship between flow and ammonia concentration with respect to loading, with the highest priority outfalls shown in red. The size of bubbles scales proportionally to loading, with larger bubbles having higher ammonia loading values.

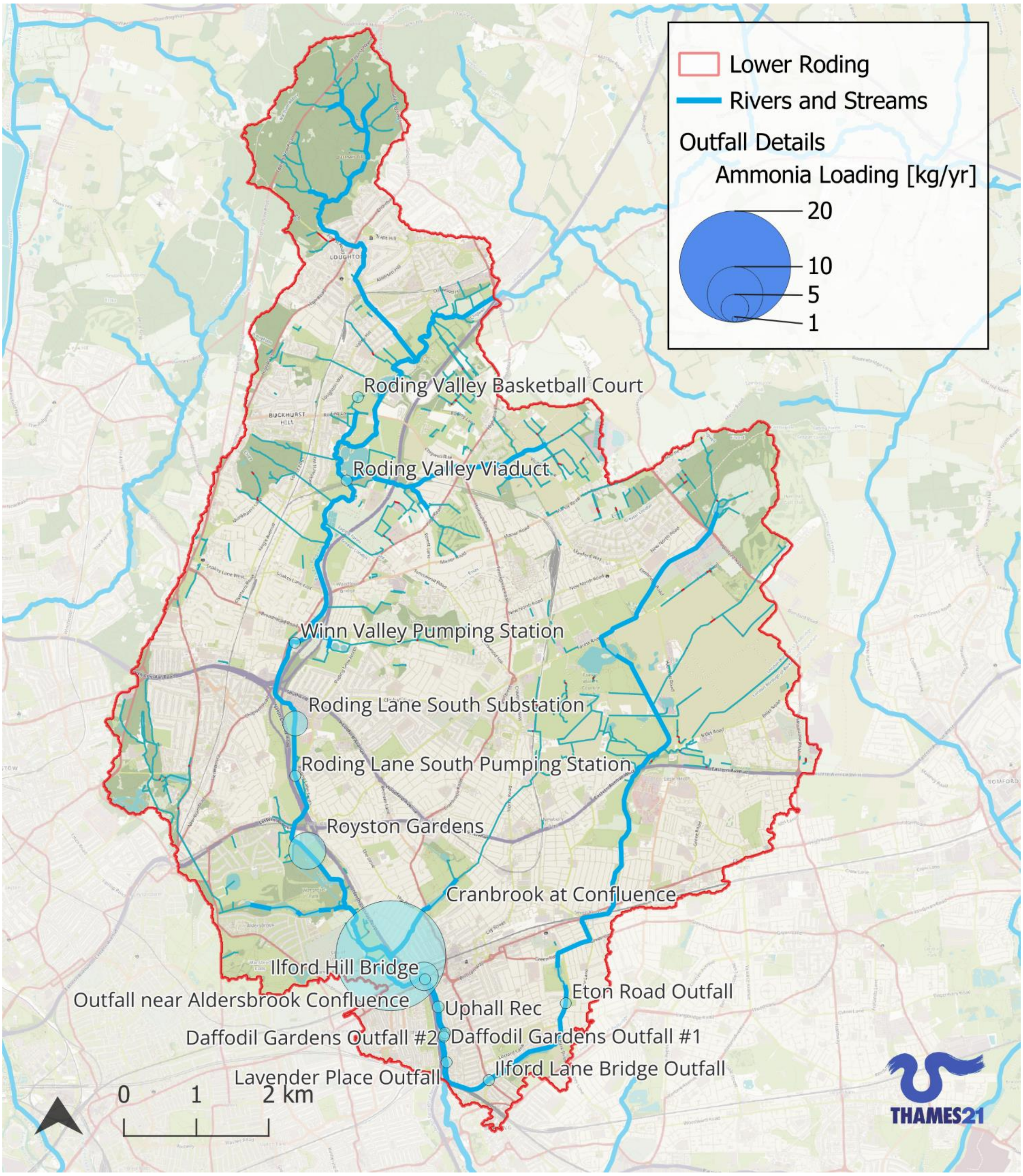


Figure 7: Map depicting outfalls showing scale of ammonia loading pollution. Size of bubbles scales proportionally with the loading input.

Table 6: Summary results for the 17 outfalls investigated in more depth. Note that all numbers for concentrations and flow are rounded to one decimal place and hence calculated loading may appear different if replicated with the exact numbers below.

Outfall Name	Average Ammonia (mg/l)	No. of Ammonia Obs.	Average Phosphate (mg/l)	No. of Phosphate Obs.	Average of Water Flow (l/s)	No. of Flow Obs.	Days Flowing per year	Ammonia Loading (kg/yr)	Rank Loading
Cranbrook at Confluence	5.7	11	3.0	5	10.9	3	365	1,977	**1**
Royston Gardens	10.5	13	3.4	6	2.2	12	365	724	**2**
Outfall near Aldersbrook Confluence	15.7	9	16.0	4	1.0	7	365	513	**3**
Roding Lane South Substation	3.9	12	4.0	6	3.6	11	365	447	**4**
Uphall Rec	12.9	15	6.1	7	0.5	11	365	213	**5**
Ilford Hill Bridge	9.5	12	4.6	6	0.5	8	365	139	**6**
Daffodil Gardens Outfall #1	2.3	2			1.5	1	365	110	7
Winn Valley Pumping Station	3.1	13	2.6	6	0.7	6	365	67	8
Ilford Lane Bridge Outfall	12.2	4	0.4	1	0.2	3	365	64	9
Lavender Place Outfall	13.3	2			0.2	2	365	63	10
Eton Road Outfall	11.7	1			0.2	1	365	55	11
Roding Valley Basketball Court	6.9	1			0.3	1	365	54	12
Paget Road Outfall	27.2	2			0.1	2	365	43	13
Roding Valley Viaduct	1.3	5	2.4	4	0.8	3	365	34	14
Roding Lane South Pumping Station	4.3	11	2.8	6	0.3	1	365	34	15
Daffodil Gardens Outfall #2	1.4	2			0.6	1	365	26	16
Charlie Browns Outfall	0.1	1	1.3	1	0.8	1	365	2	17

3.3 Priority Outfalls

This section presents an analysis of the six worst-performing outfalls identified by this investigation. Ammonia readings at these outfalls were consistently higher than WFD 'Bad' classifications, and all of them were discharging continuously during dry weather. Communications with Thames Water's network team confirmed that ammonia results of over 5mg/l are indicative of acute misconnections, cross-connections, or more extreme asset failure – this therefore suggests that all of these outfalls are heavily impacted by sewage.

Though officially categorised as surface water outfalls by Thames Water, several of the outfalls in this analysis – specifically, the Cranbrook, Royston Gardens and Roding Lane South – appear to be historic tributaries that have been culverted and diverted over time (see some analysis of this in Annex B). This would explain the relatively large flows exhibited by these outfalls, and also the large sewer catchments may offer more opportunities for misconnections.

The Cranbrook tributary was identified as having a much greater polluting impact on the river , with an estimated average ammonia input of 2,000 kg/yr — almost three times the second highest outfall, Royston Gardens, estimated at around 700 kg/yr (Table 6). It should be noted that the Cranbrook had the fewest paired flow and ammonia observations, resulting in less precision and a high standard error (ranging between 900 and 2,200 kg/yr). However, even at the lower end of this range, the Cranbrook remains substantially the worst pollution source identified. The remaining five outfalls are at a lower magnitude of ammonia loading but are nevertheless introducing extremely unsafe levels of ammonia and phosphate into the Roding. Phosphate values were consistently poor at all six outfalls, with average results at every site exceeding WFD 'Bad' classifications.

3.3.1 Uncertainty

It is important to note that due to safety concerns, flow readings at some outfalls were not always taken during monitoring sessions, meaning a variation in the number of observation data points. To address this, standard deviation and standard errors were calculated and are presented in Figure 8.

Standard error bars were calculated by retrieving the standard deviation of ammonia loading observations at each outfall. Standard deviations were then divided by the square root of the sample size:

$$SE = \frac{s}{\sqrt{n}}$$

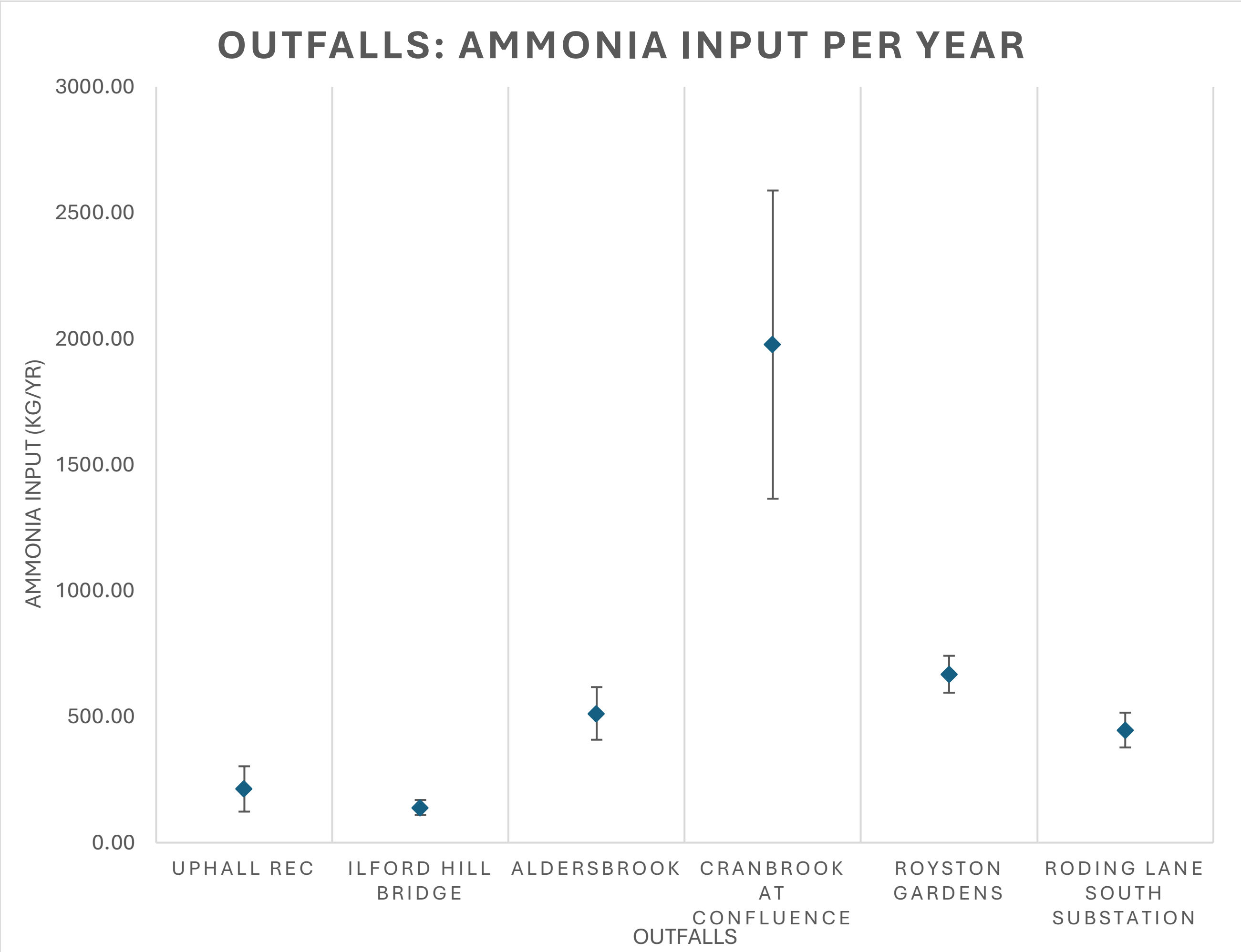


Figure 8: Graph comparing outfalls' ammonia input into Roding per year.

4 Outfall Deep Dives

Below are deeper analyses of each outfall with descriptions, photos and screenshots of videos taken during the monitoring programme. More footage and anecdotal evidence, as well as a complete spreadsheet of observations are available on request and will be supplied as attachments to this report.

4.1 Cranbrook

4.1.1 Characteristics

The Cranbrook is a largely culverted tributary of the Roding, which rises around Fairlop Waters and flows toward the South West, entering the Roding at Ilford Golf Club. Its only current daylighted section is a 20m stretch which emerges in Valentines Park, before being diverted back underground all the way to the Roding.

Though technically a tributary, the Cranbrook is almost entirely culverted or channelised. Given its consistently high ammonia content, the Cranbrook was included in outfall comparisons as it functions more as a sewer than a natural tributary.

Its visual and ecological impact on the Roding is stark, with the river being impacted by the Cranbrook for at least 100 metres downstream (Figure 10). Wading in the Cranbrook tributary and around the confluence revealed decomposed black matter underfoot which bubbles both when being disturbed, and in random undisturbed patches around the confluence. The water coming from the Cranbrook is cloudy (Figure 11), and evidence of faecal pollution has been observed on multiple occasions. The cloudiness is made up of white fluffy-looking matter which floats up as you disturb it.

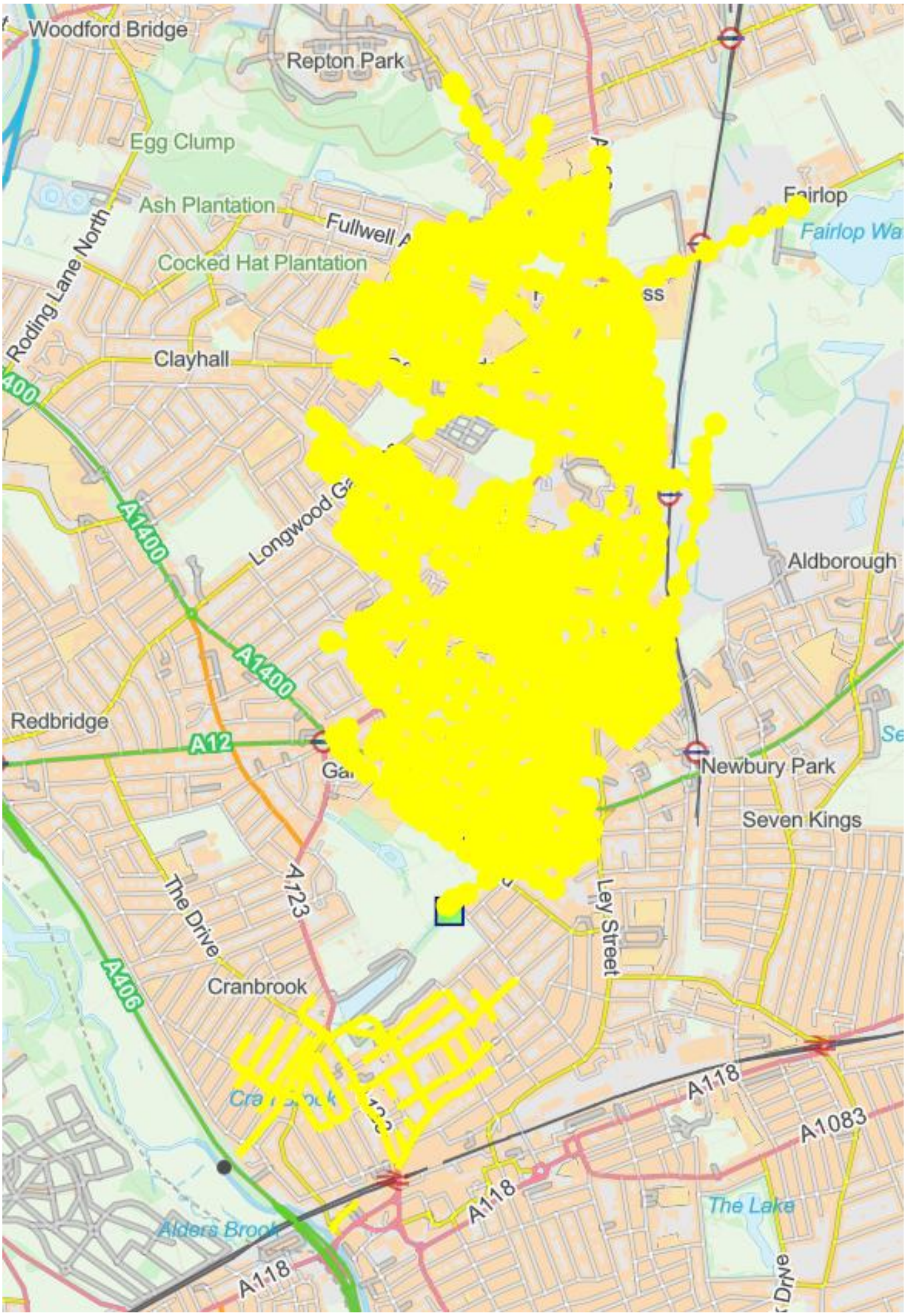


Figure 9: Surface water catchment of the Cranbrook Outfall prepared by Thames Water. Yellow lines are indicative of the surface water drains that contribute to the eventual outfall. Note that in this image the circle has been added to represent the outfall due to difficulties tracing the catchment.

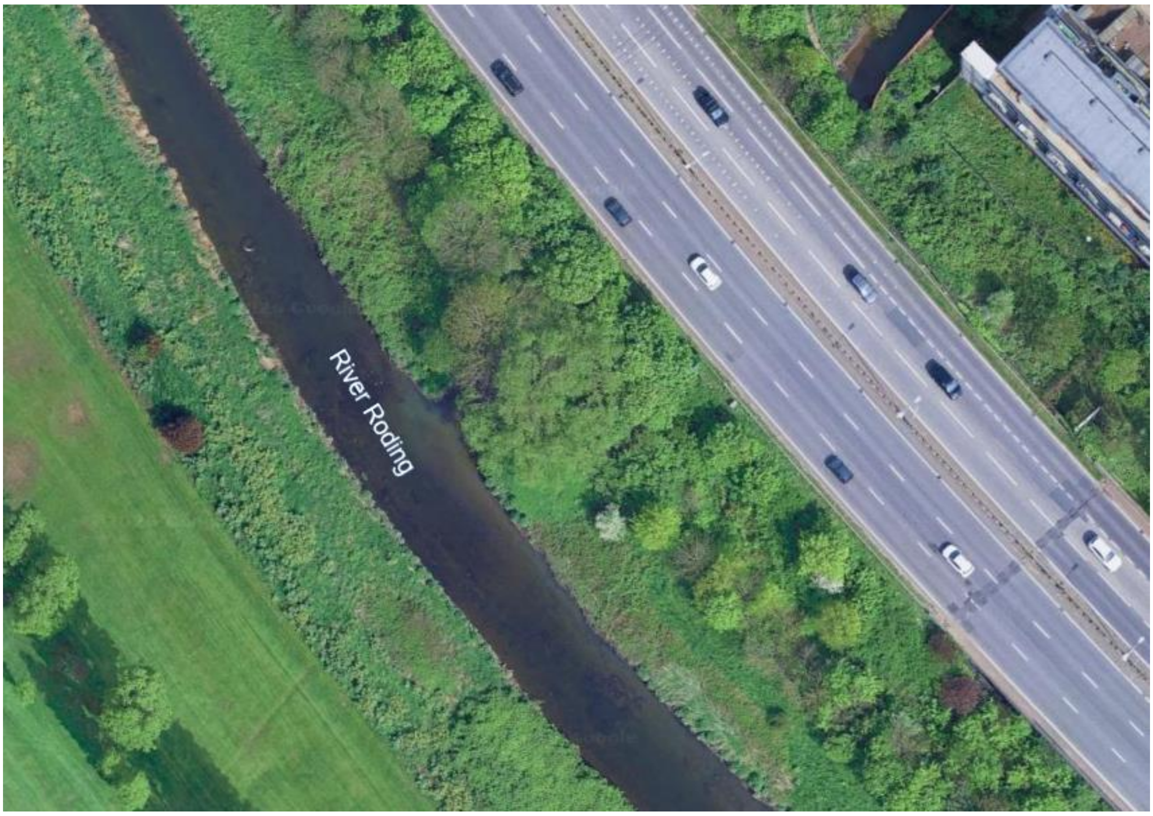


Figure 10: Visual evidence of pollution at the confluence of the Cranbrook and the Roding (Google Earth)

Figure 11: One of the only open air sections of the Cranbrook, close to the confluence showing visual evidence of pollution

4.1.2 Data Summary

As demonstrated in **Table 6**, the Cranbrook tributary contributes the most dry-weather pollution to the river Roding out of any outfalls monitored during this programme, with an estimated total of 1,977 kg ammonia per year — nearly three times the next worst outfall (Royston Gardens, at 669 kg/yr). This is driven by the combination of consistently high ammonia concentrations (average 5.85 mg/l, well above the WFD 'Bad' threshold of 2.5 mg/l) and a high volume of flow (average 10.9 l/s, equating to 941,760 litres per day). Phosphate values averaged 3.2 mg/l, also in the WFD 'Bad' category.

In comparison with other citizen science water quality monitoring results across a large proportion of London[13], the Cranbrook emerges as the capital's most polluted tributary.

Lab analysis of bacteria samples taken at both Valentine's Park and the Cranbrook–Roding confluence showed extremely elevated values of both E. coli and Intestinal Enterococci (see **Figure 12** and **Figure 13**). At the confluence, downstream E. coli values reached 242,000 MPN/100ml (the limit of detection) – at least 200 times the safe limit for swimming – while upstream values on the Roding were orders of magnitude lower, confirming the Cranbrook as the source.

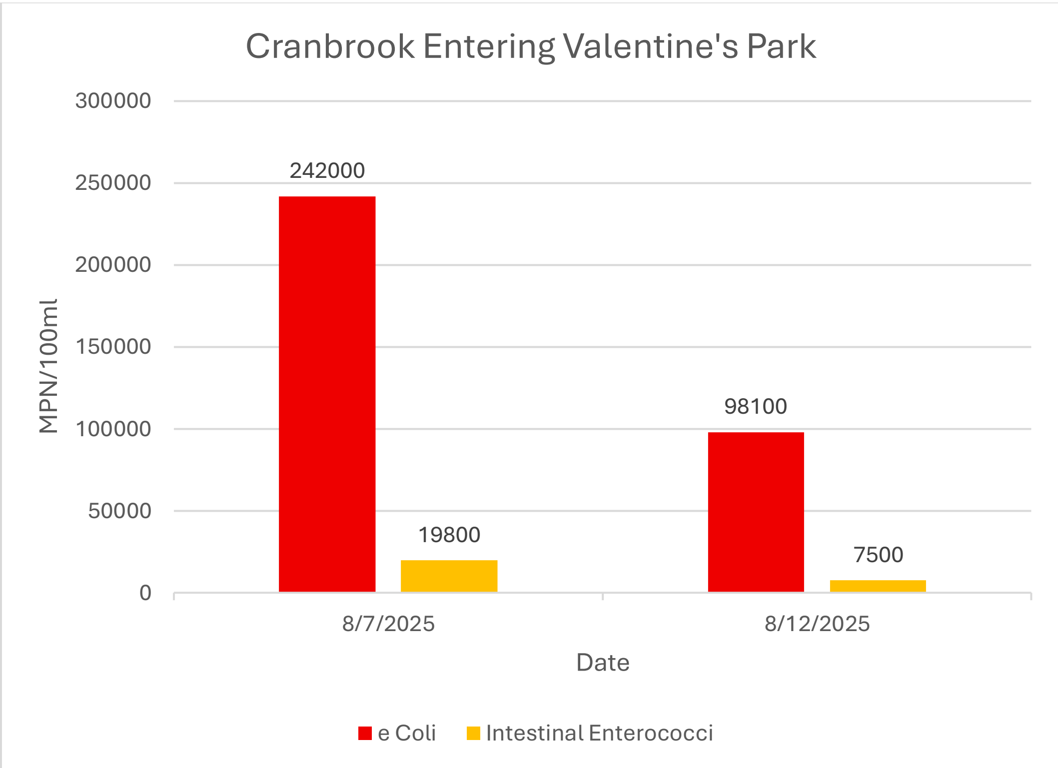


Figure 12: FIO results for Cranbrook Entering Valentine's Park

[13] When compared across Thames21's citizen science dashboard: https://www.thames21.org.uk/citizen-science-dashboard/

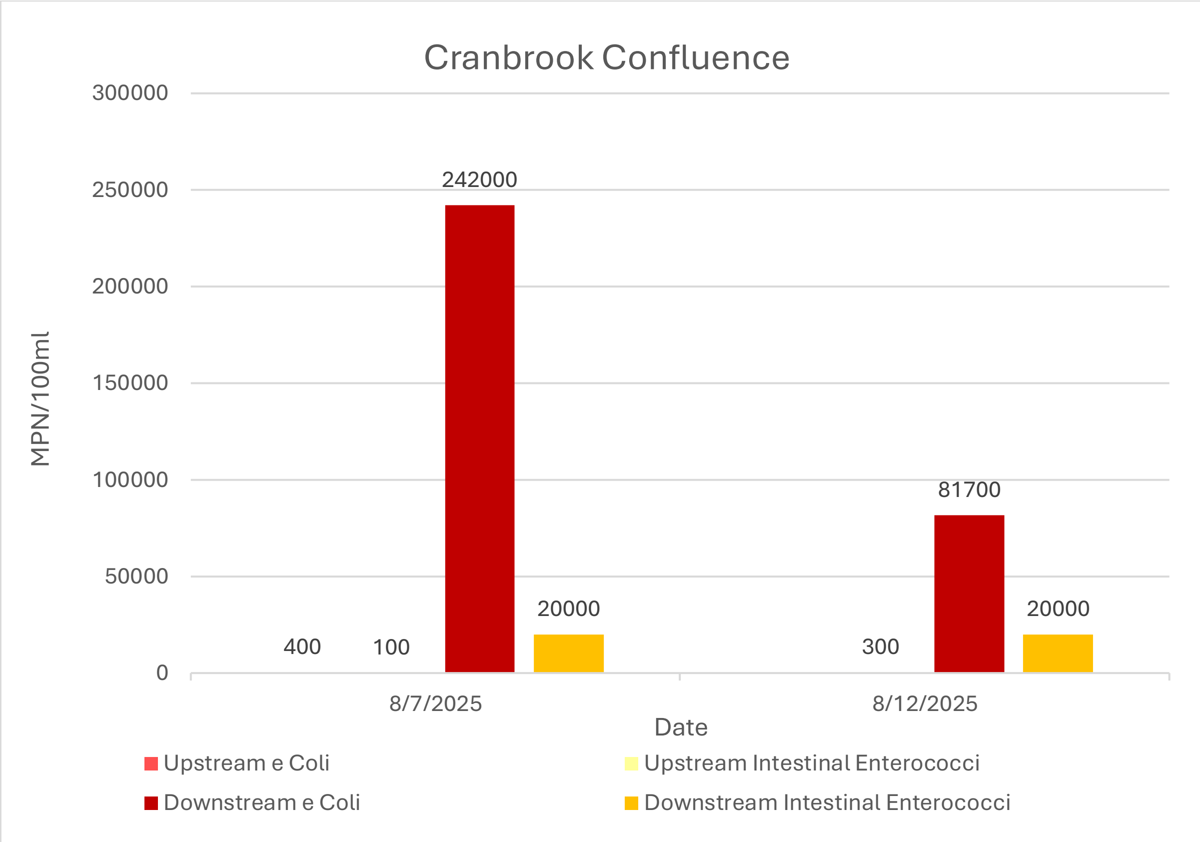


Figure 13: FIO results for upstream and downstream at Cranbrook Confluence

Table 7: All ammonia & phosphate results sampled in-river on the Cranbrook at it's confluence with the River Roding

Date	Phosphate LR (mg/l)	Phosphate HR (mg/l)	Ammonia MR (PPM)
02/05/2025	1.34		6.39
16/05/2025	2.04		6.85
04/06/2025			6.55
04/07/2025			6
09/07/2025			5.19
01/08/2025		4.4	4.34
07/08/2025			7.9
12/08/2025			6.74
27/08/2025		3.8	5.33
17/09/2025		3.6	3.8
26/09/2025			3.99
	Average phosphate: 3.2		Average ammonia: 5.85

4.1.3 Site Visit and Pollution Investigation

In October 2025, a one-off targeted investigation was undertaken on the Cranbrook by Thames Water, Thames21, the River Roding Trust, the Environment Agency and Seneye Sensors (**Figure 14**4). The investigation involved sampling at multiple points along the tributary from downstream (the confluence) to upstream (Station Road), using Hanna checkers for ammonia, accredited eDNA analysis by Applied Genomics, and qPCR for faecal indicator organisms. The aim was to identify and differentiate pollution sources along the length of the Cranbrook.

eDNA analysis (methodology outlined in section (1) confirmed the findings at Valentine's Park, with levels of both E. coli and IE classified as 'Unsafe' (see Section 2.4) in the analysis undertaken by Applied Genomics, with human-specific contaminants identified as the most likely source of faecal contamination (Figure 16). The full report for this methodology is available upon request.

This investigation indicates that the causes of the pollution of the Cranbrook are two-fold. A significant amount of the pollution is landfill leachate from Fairlop Waters, which is the responsibility of the LB Redbridge. However, e-coli and e-DNA testing, as well as visual confirmation of the Cranbrook upstream of the confluence shows that a significant amount of the pollution is from sewage (Table 8).

4.1.3.1 Sewage Pollution

Elevated levels of both ammonia and E. coli were found between the confluence and upstream to Station Rd, indicating human faecal contamination to be a major source of pollution affecting the entire Cranbrook tributary.

Samples taken at Station Rd from both the sewer line and from the line fed by leachate from the landfill under Fairlop Waters Country Park indicate that both lines are contributing to pollution on the Cranbrook Tributary (Table 8).

4.1.3.2 Leachate Pollution

Ammonia levels in the line coming from the landfill were particularly elevated, indicating that the landfill is likely to have been poorly capped, or completely uncapped. This has likely led to poor ventilation and a low oxygen environment, meaning gases, (such as ammonia, which is highly soluble) formed by biological decomposition would be unable to escape effectively except through the liquid leachate entering the Cranbrook tributary. It is also likely that the landfill leachate is contributing a high level of polycyclic aromatic hydrocarbons (PAHs) into the network. For instance, a wide range of everyday items discarded in landfills contain petroleum-based PAHs. These include things like oils and greases, certain photographic and dye products, pesticides, pharmaceuticals, various thermoset plastics, electronic components, LED materials, and tar or creosote roofing products. As these materials degrade over time, they can contribute PAHs to the surrounding leachate. Landfilled food waste is another source: when organic waste decomposes without oxygen, it can generate biologically derived PAHs, such as perylene.[14]

[14] With thanks to Nathalie Gilbert for technical expertise on landfill leachate chemical pollution.

Figure 14: Sampling undertaken by Thames Water, Thames21, River Roding Trust, the Environment Agency & Seneye Sensors in October 2025

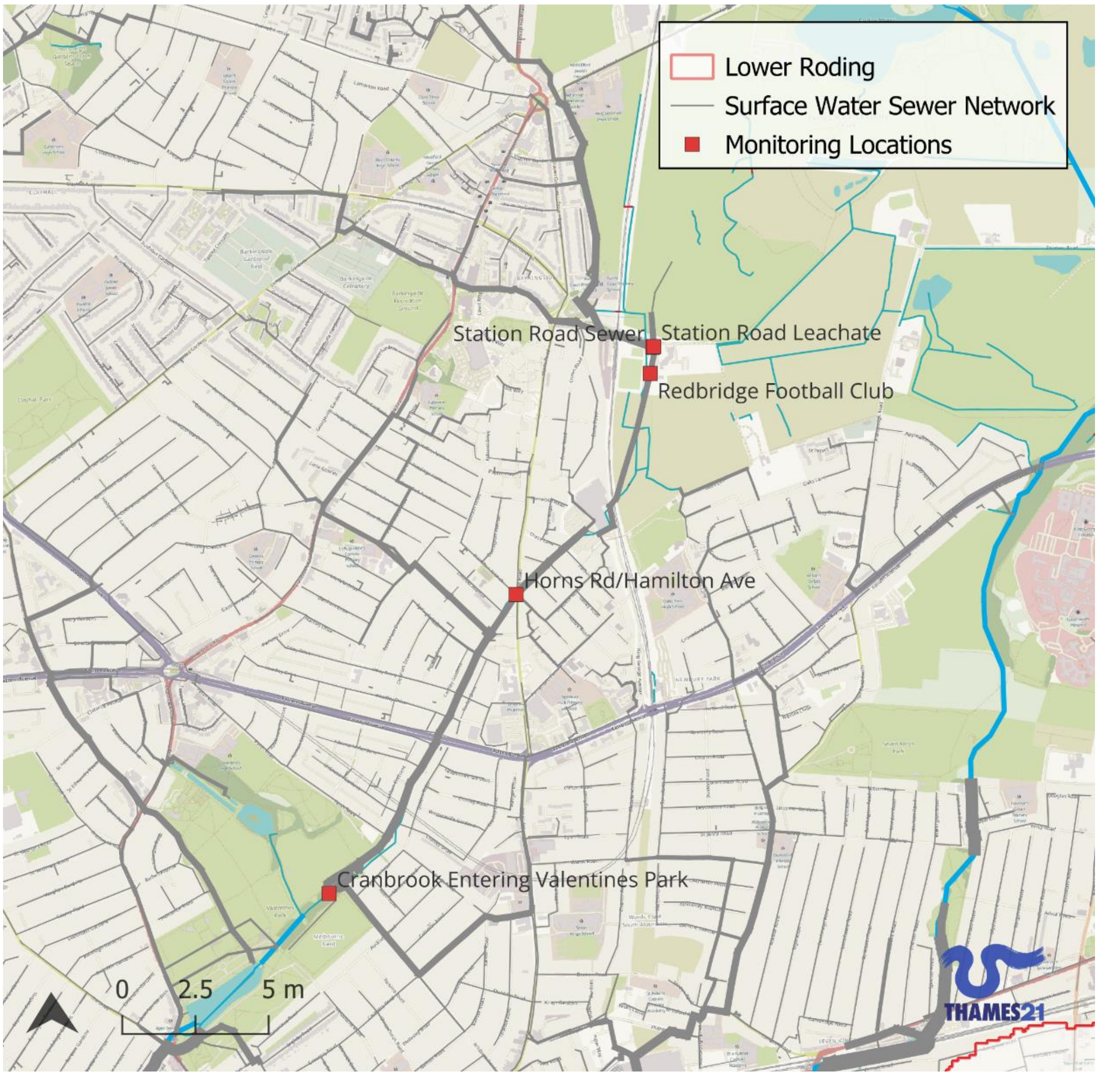


Figure 154: Sampling undertaken by Thames Water, Thames21, River Roding Trust, the Environment Agency & Seneye Sensors in October 2025

Table 8: Sample results determining pollution inputs on the Cranbrook (Source: Thames21 & Applied Genomics/Seneye Sensors)

Sample point	Ammonia	Ammonia (high range)	E. coli (c/100ml)	IE (c/100ml)	Sources of contamination	Confidence Score (out of 6)
Monitoring equipment	Hanna Checker Medium Range	Hanna Checker High Range	Applied Genomics (PCR)	Applied Genomics (PCR)	Applied Genomics (eDNA)	Applied Genomics (eDNA)
Station Road Sewer	2.56	N/A	1897	623	Human	6
Station Road Leachate	N/A	77.52	59	1	N/A	N/A
Redbridge Football Club	7.84	N/A	3465	769	Human	1
Horns Rd/Hamilton Ave	7.49	N/A	10087	27	Canine/feline	1
Cranbrook Entering Valentines Park	7.17	N/A	5844	420	Human	6

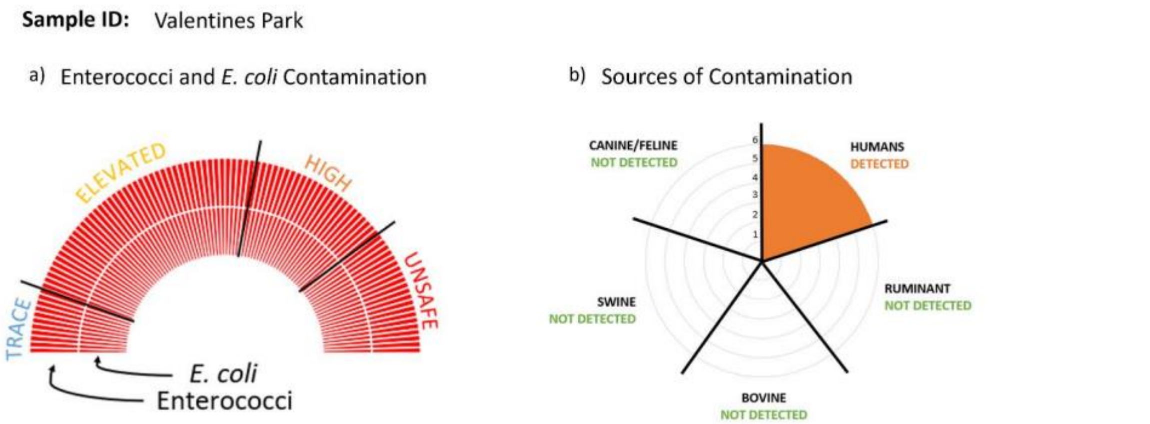


Figure 1. Results for sample 'Valentines Park'.

a) Water quality assessment using Enterococci and *E. coli* markers. Enterococci and *E. coli* DNA were both classified as "Unsafe" levels. b) Faecal contaminant confidence source radar chart. The number of qPCR replicates that amplified out of six is displayed. Human-specific contaminants were identified as possible contamination sources, with six qPCR replicates displaying amplification.

Figure 16: eDNA sample results from the Cranbrook at Valentine's Park (Source: Applied Genomics)

4.1.4 Proposed Solutions

Given the levels of pollution and the impact on the Roding, the Cranbrook is the top priority to solve, and a solution (temporary or permanent) needs to be in place within 12 months.

Table 9: Proposed actions per-organisation, alongside sort- and long-term solutions.

Organisation / Timeframe	Detail
Proposed actions and priorities per-organisation	
Thames Water	• *Ongoing*: SWOP investigations continue through the Cranbrook catchment as of February 2026 • Any faulty assets to be repaired.
Redbridge Council	• *Ongoing*: Investigations into sources of leachate and levels of pollution. • Solutions to be proposed and implemented for leachate pollution. • Enforcement of correction of misconnections . • Progression of Nature-based solutions on Redbridge-owned land (specifically at Aldborough Hatch and Valentines Park).
Environment Agency	• Deployment of EA sondes for further investigation of pollution – a proposed location would be Valentines Park.
Proposed short- and long-term solutions	
Short-term solutions	• Misconnections resolved as a priority. Monitoring undertaken following this to determine if any further asset failures remain. • At least 1 treatment wetland constructed by the end of 2026. Ideally 2 constructed; one at Aldborough Hatch & one at Valentine's Park.
Long-term solutions	• Landfill leachate properly treated in the near future. Tributary de-culverted and daylighted as much as is possible.

4.2 Royston Gardens

4.2.1 Characteristics

Royston Gardens is likely a culverted tributary (see Annex B) with a flap valve on the outfall. Flow was present in dry weather, and the volume and ammonia concentrations (average suggest that there is sewage from either cross-connections, or from a significant number of misconnections (see table 6).

There is a clear visual impact on the river, although this dissipates reasonably quickly and the ecological impact is nowhere near as large as the Cranbrook confluence.

Royston Gardens outfall is located on a shallow, gravelly section of the river, alongside Wanstead Park & just downstream from 'Wanstead Beach'. The level of public access to the river at this point gives a significant impetus to fixing this outfall.

Figure 17: Stills from video evidence showing cloudy water at Royston Gardens outfall

Figure 18: Surface water catchment of the Royston Gardens Outfall prepared by Thames Water. Yellow lines are indicative of the surface water drains that contribute to the eventual outfall, which is represented as a green square.

4.2.2 Data Summary

Royston Gardens was identified by this investigation as the second most polluting outfall on the lower Roding, with an estimated loading of 724kg ammonia/yr. Average ammonia was 10.52 mg/l, over four times the WFD 'Bad' threshold of 2.5 mg/l, with high-range readings reaching 19.9 mg/l (nearly eight times 'Bad')[15]. Average phosphate was 3.43 mg/l, exceeding the WFD 'Bad' threshold of 3.3 mg/l. Average dry-weather flow was 2.2 l/s.

Downstream bacteria sampling on 7 August confirmed the outfall as a source of faecal contamination, with E. coli at 2,300 MPN/100ml (over 2.5 times the Bathing Water 'Sufficient' standard of 900 MPN/100ml) and IE at 1,700 MPN/100ml (over five times the 'Sufficient' standard of 330 cfu/100ml)[16]. The outfall showed significant water opacity and discolouration throughout the monitoring period.

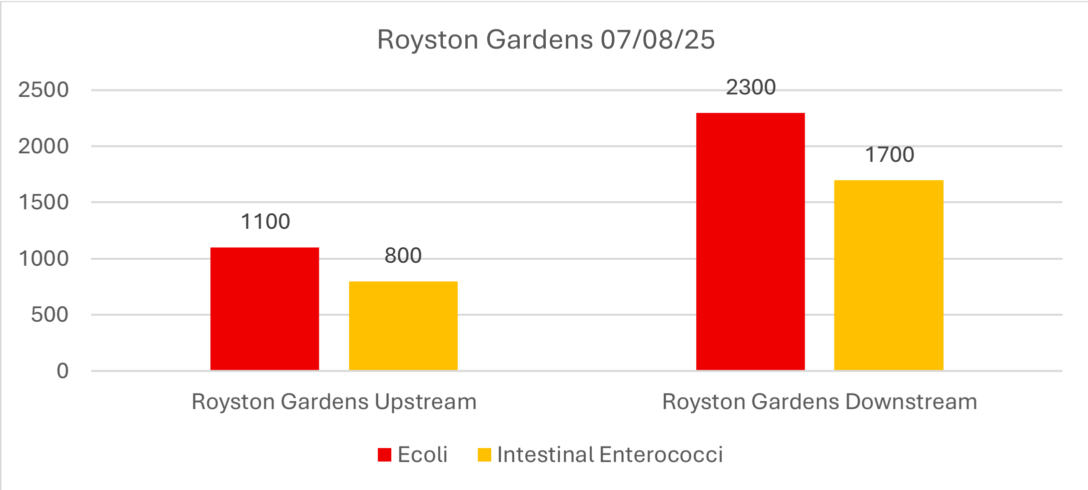


Figure 19: FIO results for upstream and downstream at Royston Gardens outfall

Table 10: All ammonia & phosphate results for Royston Gardens outfall. Note that >10 indicates 9.99 mg/l on the mid-range ammonia Hanna checker, meaning the checker maxed out.

Date	Phosphates LR (mg/l)	Phosphates HR (mg/l)	Ammonia MR (mg/l)	Ammonia HR (mg/l)	Notes
02/05/2025	2.5		8.54		Outfall showing significant water opacity and discoloured water for some time. A pretty consistent and significant flow even in dry weather.
16/05/2025	2.5		>10		
27/05/2025	1.2		0.54		
04/07/2025			>10		
09/07/2025		6.9	5.46		
25/07/2025			>10		
01/08/2025		4.3	6.8		

[15] WFD ammonia standards are formally defined as the 90th percentile of regular samples over a year in the receiving watercourse; it is used here as a frame of reference rather than a formal classification, since this dataset comprises targeted spot samples at the outfall rather than a year-round monitoring programme. Note that this comparison is conservative: the mean of a dataset is lower than its 90th percentile, so where the mean alone exceeds the threshold, a percentile-based assessment would exceed it by a greater margin.
[16] Similarly to above, these comparisons are with classifications which are applied to the 90th percentile of a longer (usually monthly) data series.

07/08/2025			>10	19.9	
12/08/2025				19.17	
27/08/2025			>10	19.48	
17/09/2025	3.2		7.26		
26/09/2025			9.1		
	Average phosphate: 3.43		Average ammonia: 10.52		

4.2.3 Proposed Solutions

This outfall has previously been identified as problematic, and Thames Water has begun investigations into asset failure and misconnections. A significant opportunity is apparent here for the delivery of Nature-based Solutions at Royston Gardens, with large parts of land currently lying unused – this could potentially be a good site to de-culvert the surface water line and pass it through a constructed wetland system to reduce the sewage and road runoff pollution entering the Roding. Resources should be placed into further scoping this opportunity.

Table 11: Proposed actions per-organisation, alongside sort- and long-term solutions.

Organisation / Timeframe	**Detail**
Proposed actions and priorities per-organisation	
Thames Water	• *Ongoing*: SWOP investigations continue through the Royston Gardens catchment. • Any faulty assets leading to sewage release via this outfall to be added to prioritised list for rectification.
Redbridge Council	• Enforcement of correction of misconnections. • Scoping and progression of Nature-based solutions on Redbridge-owned land (specifically at Royston Gardens).
Environment Agency	• Deployment of EA monitoring resources (sondes) for further investigation of pollution – a proposed location would be upstream / downstream of the outfall in the main Roding
Proposed short- and long-term solutions	
Short-term solutions	• Misconnections resolved as a priority. Monitoring undertaken following this to determine if any further asset failures remain.
Long-term solutions	• Nature-based solutions progressed in Royston Gardens – potentially the delivery of wetlands to treat incoming water from surface water network before it enters the Roding.

4.3 Aldersbrook

4.3.1 Characteristics

The Aldersbrook Outfall drains a relatively small surface water catchment (see Figure 20). It discharges into a relatively inaccessible area of the Roding which was only found via wading upstream under Ilford Hill Bridge.

This outfall has both high ammonia levels and a pronounced visual impact on the river. The water is cloudy downstream of the outfall and there is usually visible faeces and toilet paper. This suggests that any misconnection or fault causing the sewage to enter the river is close to the outfall, as it has not had much time to break down.

The cumulative impact of this outfall with the three others nearby (Ilford Hill Bridge, Uphall Rec, Cranbrook) is significant, and sewage pollution in the vicinity is having an obvious impact on this section of the Roding.

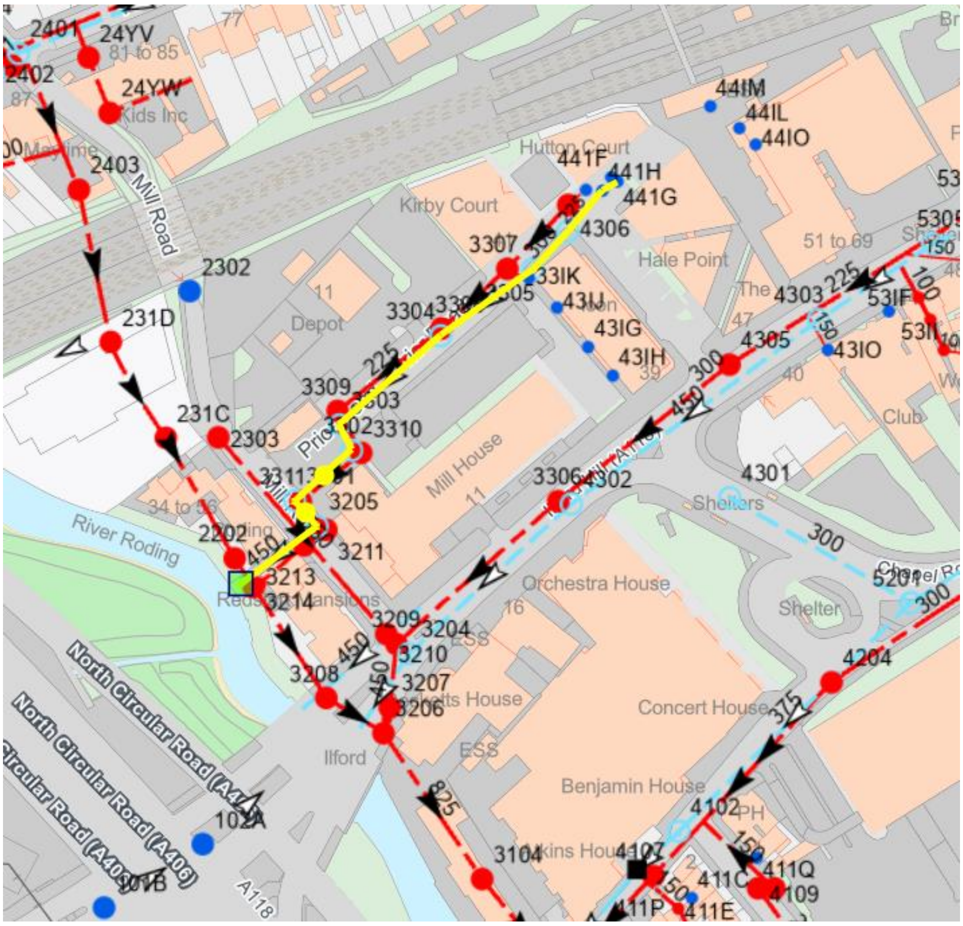


Figure 20: Surface water catchment of the Aldersbrook Outfall prepared by Thames Water. Yellow lines are indicative of the surface water drains that contribute to the eventual outfall, which is represented as a green square.

Figure 21: outfall at Aldersbrook showing evidence of sewage pollution

4.3.2 Data Summary

Aldersbrook is the third most polluting outfall, with an estimated ammonia loading of 513 kg/yr. It recorded the second highest average ammonia concentration of any priority outfall at 15.71 mg/l — over six times the WFD 'Bad' threshold. On multiple occasions, ammonia readings exceeded the medium-range Hanna checker limit of 9.99 mg/l, and high-range readings of 36.9 and 37.4 mg/l were recorded in August 2025. Phosphate values averaged 15.98 mg/l, by far the highest of any priority outfall and nearly five times the WFD 'Bad' classification.

Despite the extremely high concentrations, the relatively low average flow of 1 l/s means the total loading is lower than the Cranbrook, Royston Gardens, and Roding Lane South. However, the presence of visible faeces and toilet paper at the outfall on multiple occasions strongly suggests a very local misconnection or asset failure close to the discharge point.

Table 12: All ammonia & phosphate results at Aldersbrook outfall

Date	Phosphates HR (mg/l)	Ammonia MR (mg/l)	Ammonia HR (PPM)	On-site Notes
04/06/2025	12.9	>10		
04/07/2025		>10		
09/07/2025	27.4	>10		
25/07/2025		3.47		Toilet paper in the water suggests asset failure that should be investigated
01/08/2025	12.9	>10		

07/08/2025			36.9	Flow volume changed during visit and faeces came out of the outfall, suggests a very local misconnection issue
12/08/2025			37.4	
27/08/2025			13.66	
17/09/2025	10.7	>10		
	Average phosphate: 15.98	Average ammonia: 15.71		

4.3.3 Proposed Solutions

Until this project, this outfall was not on Thames Water's Surface Water Outfall Programme. It has now been moved onto this list – the surface water catchment for this outfall is relatively small, meaning there is limited infrastructure to inspect, so it may be simple to track down the sources of pollution.

Collaboration should be maintained to ensure that action is taken to fix asset failure and misconnections which are currently discharging sewage via this outfall.

Table 13: Proposed actions per-organisation, alongside sort- and long-term solutions.

Organisation / Timeframe	Detail
Proposed actions and priorities per-organisation	
Thames Water	• *Ongoing:* Not previously on TW's SWOP list, now moved to list. Current status is "Awaiting Start" as of February 2026. • Any faulty assets leading to sewage release via this outfall to be added to prioritised list for rectification.
Redbridge Council	• Enforcement of correction of misconnections – especially those identified by Thames Water but not addressed.
Environment Agency	• Deployment of EA monitoring resources (sondes) for further investigation of pollution – a proposed location would be upstream / downstream of the series of problem outfalls identified in this report – Aldersbrook, Ilford Hill Bridge and Uphall Rec.
Proposed short- and long-term solutions	
Short-term solutions	• Misconnections resolved as a priority. Monitoring undertaken following this to determine if any further failures remain.
Long-term solutions	• Continuous monitoring of outfall to ensure that new asset failures or misconnections don't emerge.

4.4 Roding Lane South Substation

4.4.1 Characteristics

Roding Lane Substation is an interesting outfall, given that it doesn't have much visual impact on the river but is a significant source of sewage pollution. This is because this outfall is likely an tributary which has been culverted (see Annex B) with significant flows even in dry weather. This dilutes the ammonia values to below many of the other outfalls outlined in this report. However, the high volume of the outfall means that the sewage loading and thus impact on the Roding is of concern.

This outfall is in a publicly accessible area, with a number of gravel 'beaches' and pools that would be good for swimming or paddling if the pollution is removed, which gives added impetus to resolve the pollution.

Figure 22: Surface water catchment of the Roding Lane South Outfall prepared by Thames Water. Yellow lines are indicative of the surface water drains that contribute to the eventual outfall. Note that in this image the circle has been added to represent the outfall due to difficulties tracing the catchment.

Figure 23: Outfall at Roding Lane South Substation

4.4.2 Data Summary

Roding Lane South was identified by this investigation as the fourth most polluting outfall on the lower Roding, with an estimated loading of 447 kg ammonia/yr. Its average ammonia of 4.71 mg/l (nearly double the WFD 'Bad' threshold) is lower than other priority outfalls identified, but its high average flow of 3.6 l/s — the highest of any outfall monitored in this programme — drives a substantial total load. This outfall would have been overlooked without the flow-based loading methodology. Average phosphate was 3.71 mg/l, exceeding the WFD 'Bad' threshold.

Downstream E. coli reached 5,400 MPN/100ml on 7 August — six times the Bathing Water 'Sufficient' standard — versus 1,600 MPN/100ml upstream. Ten properties have been identified as misconnected and are currently being rectified.

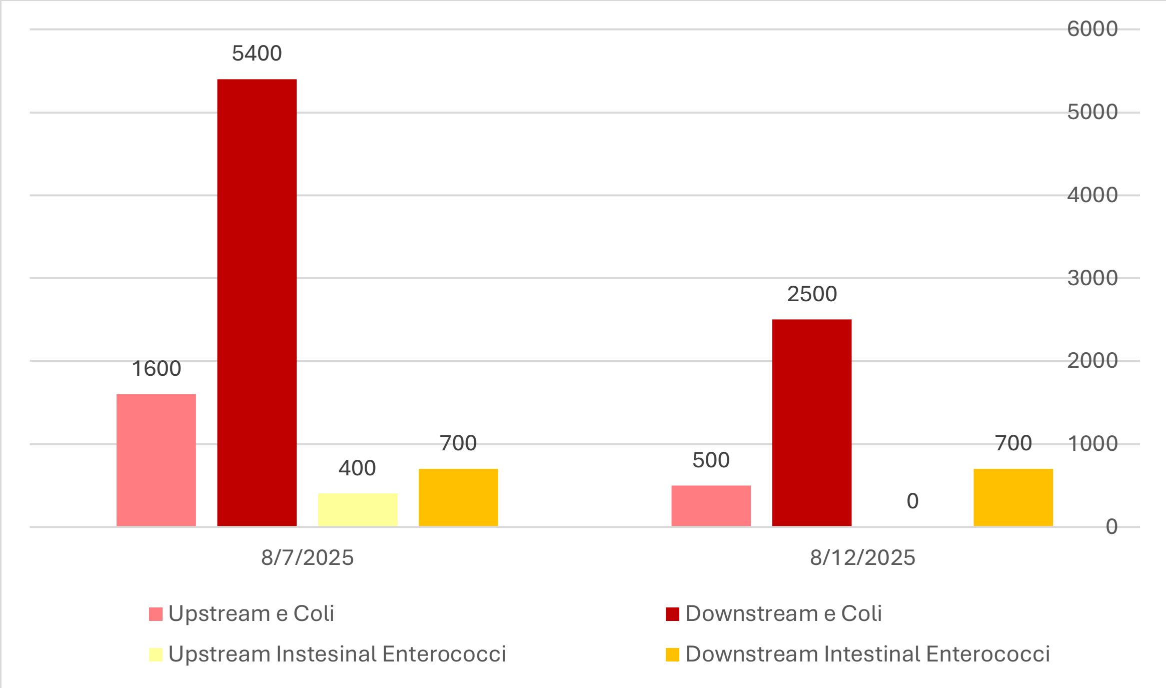


Figure 24: FIO results upstream and downstream at Roding Lane South Substation

Table 14: All ammonia & phosphate results for Roding Lane South Substation outfall

Date	Phosphates LR (mg/l)	Phosphates HR (mg/l)	Ammonia MR (mg/l)
16/05/2025	>2.5		5.59
04/06/2025			5.8
09/07/2025		3.4	3.73
18/07/2025		4.3	4.96
25/07/2025			3.02
01/08/2025		2.6	3.18
07/08/2025			2.48
12/08/2025			4.12
27/08/2025		6.2	5.85
17/09/2025		4.8	3.15
26/09/2025			5.43
	Average phosphate: 3.71		Average ammonia: 4.71

4.4.3 Proposed Solutions

This outfall was recently added to TW's Surface Water Outfall Programme list, with ten properties identified as misconnected. It is imperative that these properties' misconnections are resolved swiftly, and that monitoring remains following these remediations to ensure no other inputs are affecting ammonia levels at this outfall. Continued collaboration across partners should focus on monitoring the effects of proposed actions arising from this and continuously checking that asset failures or misconnections are contributing further pollution to the Roding.

Nature-based approaches to dealing with pollution at this outfall could include the extension of existing reedbeds in the main Roding channel to screen discharge from the outfall.

Table 15: Proposed actions per-organisation, alongside sort- and long-term solutions.

Organisation / Timeframe	**Detail**
Proposed actions and priorities per-organisation	
Thames Water	• *Ongoing*: Outfall has been placed on the Surface Water Outfall Programme list. Current status (as of February 2026) is "Interim sign off". • Any faulty assets leading to sewage release via this outfall to be repaired.
Redbridge Council	• Enforcement of correction of misconnections. •
Environment Agency	• Deployment of EA monitoring resources (sondes) for further investigation of pollution – a proposed location would be upstream / downstream of the outfall in the main Roding.
Proposed short- and long-term solutions	
Short-term solutions	• Misconnections resolved as a priority. Monitoring undertaken following this to determine if any further asset failures remain.
Long-term solutions	• Continuous monitoring of outfall to ensure that new asset failures or misconnections don't emerge.

4.5 Uphall Rec

4.5.1 Characteristics

Uphall Rec outfall is a surface water outfall covered by a flap valve that discharges straight into the Roding (see Figure 26). Given that the outfall was flowing all the times of sampling (even in dry weather), it is likely to be a covered tributary that has been contaminated with sewage, or pure sewage contamination. This outfall consistently has a visible impact on the river, and is often augmented with visible solids, rag and cooking fat.

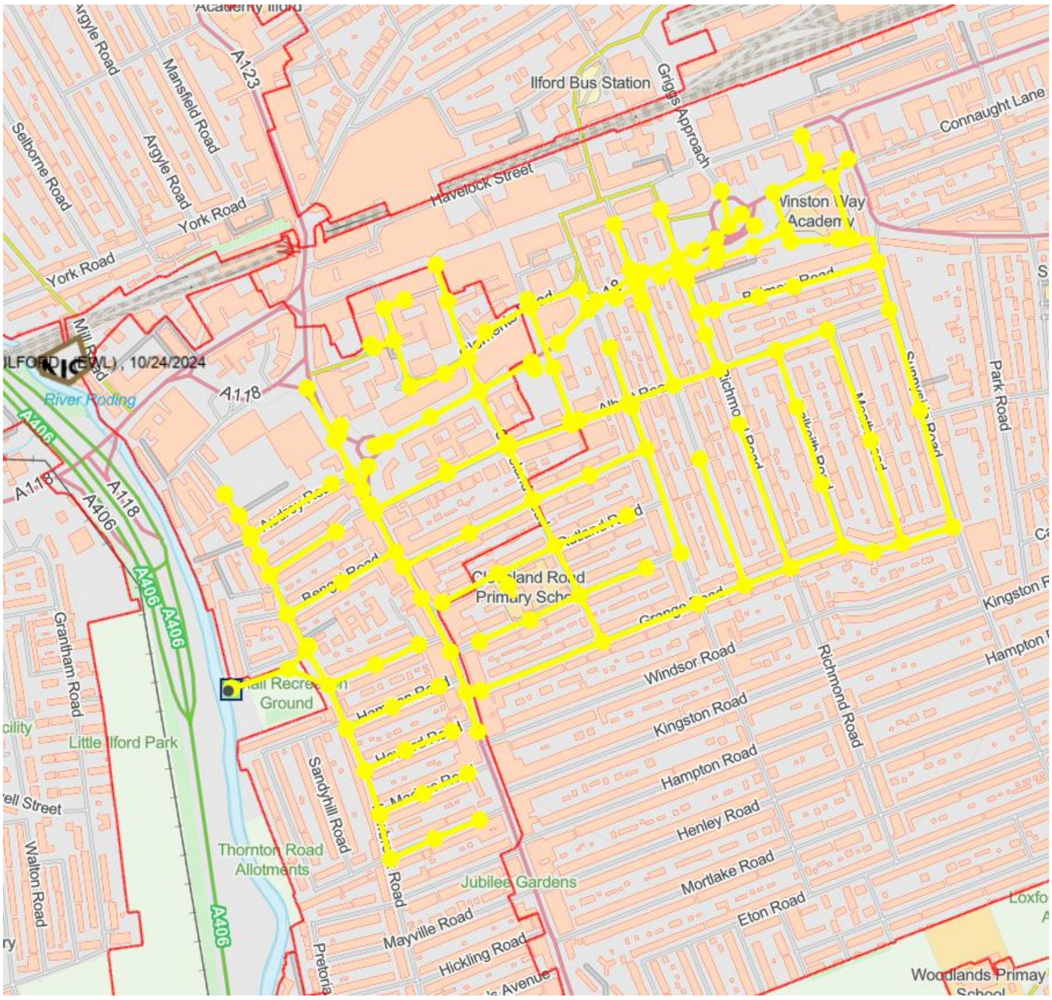


Figure 25: Surface water catchment of the Uphall Rec Outfall prepared by Thames Water. Yellow lines are surface water drains that contribute to the eventual outfall, which is represented as a black square.

Figure 26: Cloudy water at Uphall Rec outfall.

4.5.2 Data Summary

Uphall Rec was identified by this investigation as the fifth most polluting outfall on the lower Roding, with an estimated loading of 213 kg ammonia/yr. Average ammonia was 13.86 mg/l (over five times the WFD 'Bad' threshold), with the single highest individual reading recorded by this programme at 46.9 mg/l — nearly 19 times the 'Bad' threshold. Average phosphate was 9.18 mg/l, nearly three times the WFD 'Bad' threshold.

On 7 August, downstream E. coli reached 242,000 MPN/100ml — the limit of detection and over 269 times the Bathing Water 'Sufficient' standard (see Section 2.4) — compared to 1,500 MPN/100ml upstream, confirming the outfall as a major faecal contamination source. Visible solids, rag and cooking fat were frequently observed. The high concentrations are suggestive of serious misconnections or cross-connections.

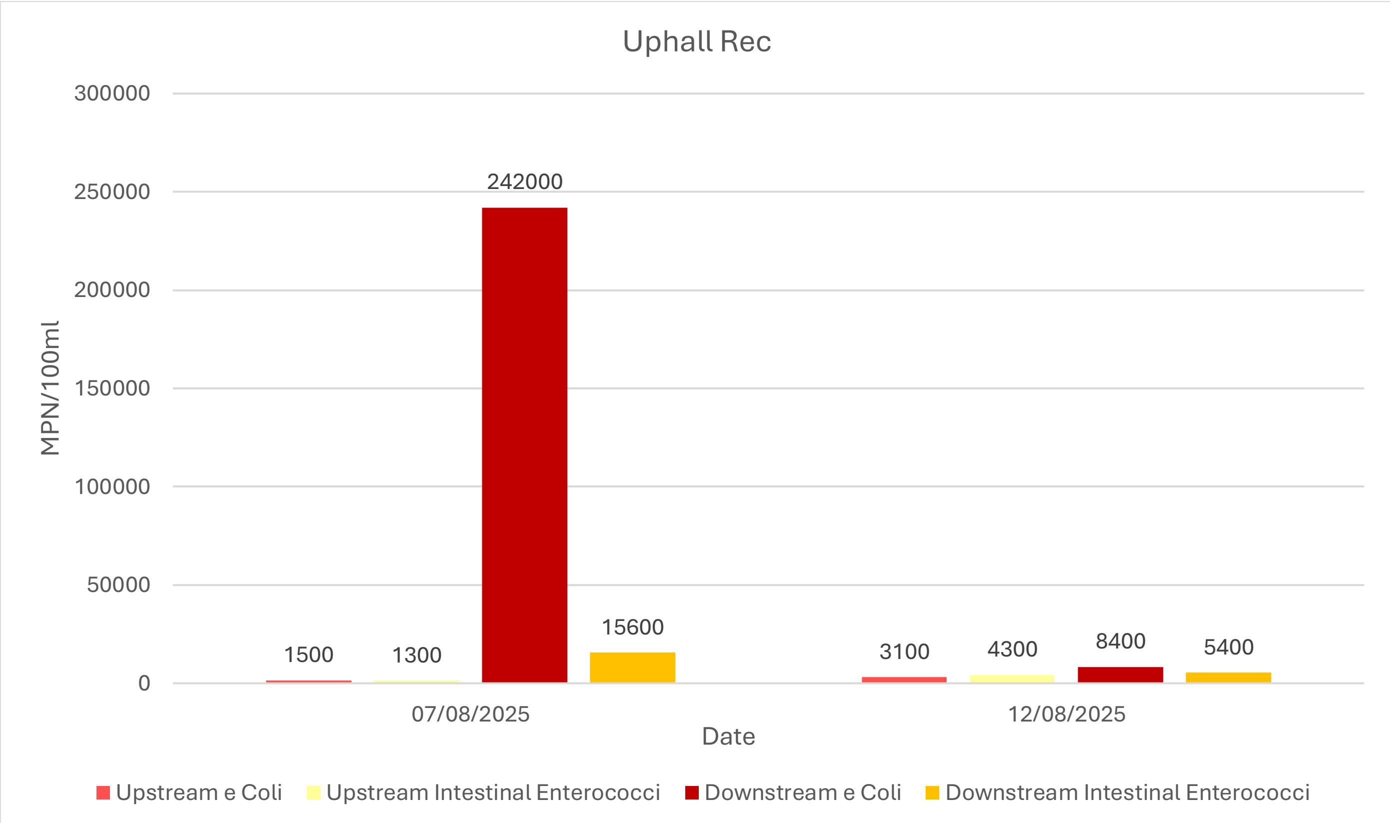


Figure 27: FIO results upstream and downstream at Uphall Rec outfall.

Table 16: All ammonia & phosphate results at Uphall Rec outfall.

Date	Phosphates LR (mg/l)	Phosphates HR (mg/l)	Ammonia MR (mg/l)	Ammonia HR (mg/l)
02/05/2025	>2.5		>10	
08/05/2025	0.25		0.51	
16/05/2025	0		>10	
27/05/2025		10	8.76	
04/07/2025			>10	
09/07/2025		10.4	>10	
18/07/2025			3	
25/07/2025			3.44	
01/08/2025		11.1	>10	

07/08/2025				46.9
12/08/2025				30.73
27/08/2025				30.73
17/09/2025		8.6	>10	
26/09/2025			>10	
	Average phosphate: 9.18		Average ammonia: 13.86	

4.5.3 Proposed Solutions

The location of the outfall next to a public park in a high population area and the cumulative impact and harm on this stretch of the river from the Cranbrook, Ilford Hill Bridge and Uphall Rec outfalls give added impetus to remediate this outfall as soon as possible.

This outfall was not previously identified by Thames Water and should be moved onto the Surface Water Outfall Programme as a matter of priority.

As it passes through a park, before discharging to the Roding, there may be opportunities for the delivery of Nature-based solutions here in the form of constructed wetlands. This should be further investigated through scoping studies.

Table 17: Proposed actions per-organisation, alongside sort- and long-term solutions.

Organisation / Timeframe	**Detail**
Proposed actions and priorities per-organisation	
Thames Water	• SWOP investigations for the Aldersbrook, Uphall Rec and Ilford Hill Bridge outfalls should be conducted as a single programme of work. • Any faulty assets leading to sewage release via this outfall to be repaired.
Redbridge Council	• Enforcement of correction of misconnections. • Investigation into the delivery of Nature-based solutions on Redbridge-owned land (specifically at Uphall Rec Gardens).
Environment Agency	• Deployment of EA monitoring resources (sondes) for further investigation of pollution – a proposed location would be upstream / downstream of the series of problem outfalls identified in this report – Aldersbrook, Ilford Hill Bridge and Uphall Rec.
Proposed short- and long-term solutions	
Short-term solutions	• Misconnections resolved as a priority. Monitoring undertaken following this to determine if any further asset failures remain.
Long-term solutions	• Continuous monitoring of outfall to ensure that new asset failures or misconnections don't emerge. • Nature-based solutions progressed in Uphall Rec – potentially the daylighting of surface water network and delivery of wetlands to treat

	incoming water from surface water network before it enters the Roding.

4.6 Ilford Hill Bridge

4.6.1 Characteristics

The discharge at Ilford Hill Bridge appears reasonably clear, with little visual impact on the river. However, the outfall has reasonably high ammonia levels, which, combined with the constant flows gives it a sufficiently high loading on the river to warrant concern. This is especially so given its location near three other significant outfalls, which mean that the stretch of the river into which it discharges is the most impacted by sewage on the whole river. Prior to this monitoring programme, this outfall was not on Thames Water's SWOP list, but has now been added.

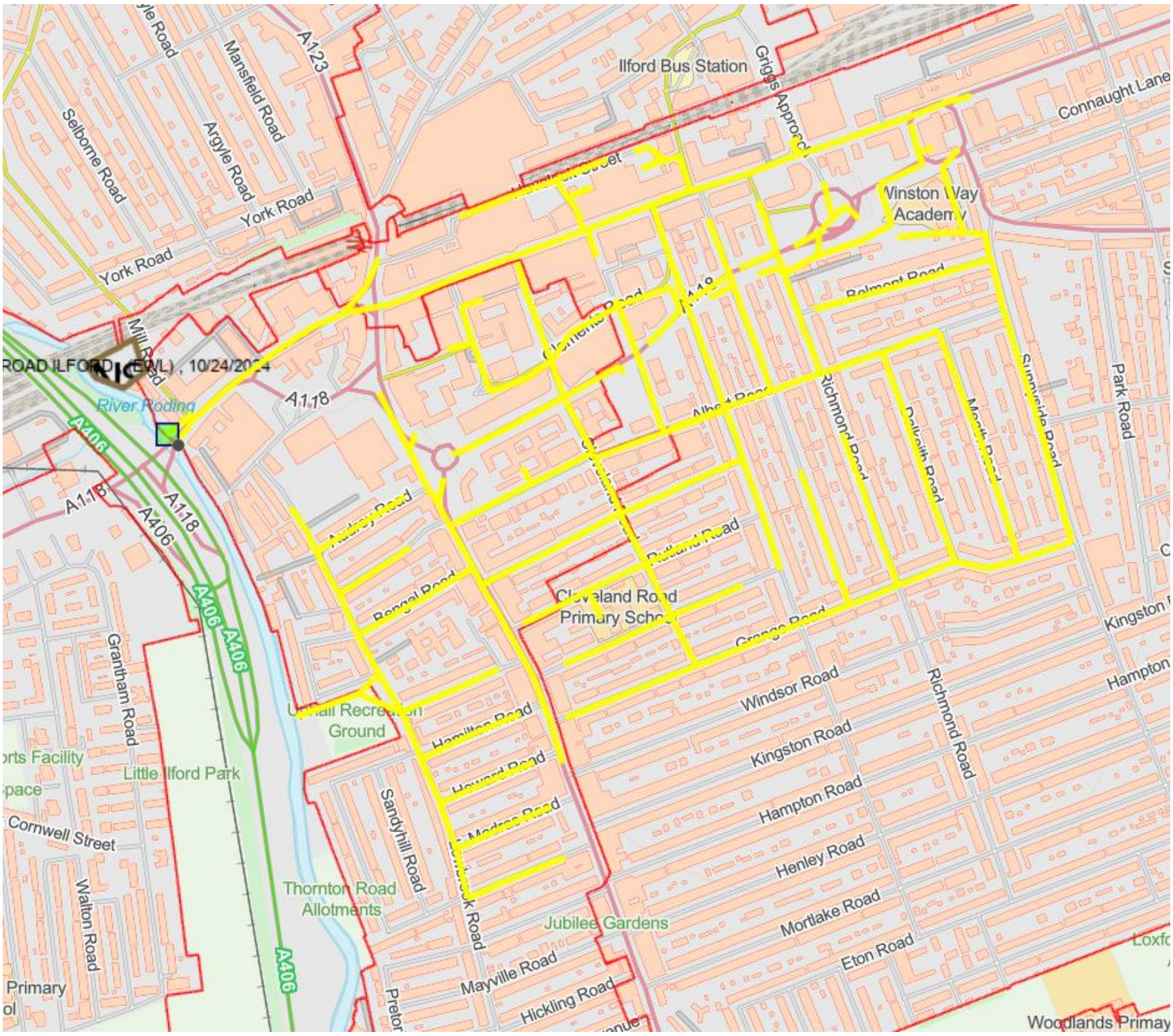


Figure 28: Surface water catchment of the Ilford Hill Bridge Outfall prepared by Thames Water. Yellow lines are indicative of the surface water drains that contribute to the eventual outfall, which is represented as a green square.

Figure 29: Still from a video of discharge from the outfall at Ilford Hill Bridge.

4.6.2 Data Summary

Ilford Hill Bridge was identified by this investigation as the sixth most polluting outfall on the lower Roding, with an estimated loading of 139 kg ammonia/yr. Average ammonia was 9.59 mg/l (nearly four times the WFD 'Bad' threshold) and phosphate 5.15 mg/l (over 1.5 times 'Bad'). Early readings in May were low (0.02–0.65 mg/l, within WFD 'Good' to 'Very Good' ranges), but values rose sharply from June, with high-range readings reaching 28.6 mg/l in August — over 11 times the WFD 'Bad' threshold. This pattern possibly indicates a new or worsening misconnection during the monitoring period. Despite little visible impact on the river, the consistent dry-weather flows and its location alongside three other priority outfalls identified by this programme (Cranbrook, Aldersbrook, Uphall Rec) make this the most sewage-impacted stretch of the river identified during monitoring.

Table 18: All ammonia & phosphate results at Ilford Hill Bridge

Date	Phosphates LR (mg/l)	Phosphates HR (mg/l)	Ammonia MR (mg/l)	Ammonia HR (mg/l)
02/05/2025	2.03		0.65	
16/05/2025	>2.5		0.02	
27/05/2025		3.1	0.38	
04/06/2025		6.6	4.95	

04/07/2025			>10	
09/07/2025		6.7	>10	
25/07/2025			9	
01/08/2025		6.4	>10	
07/08/2025				28.6
12/08/2025				21.96
27/08/2025			8.23	
17/09/2025			>10	
	Average phosphate: 5.15	5.15	Average ammonia: 9.59	

4.6.3 Proposed Solutions

This outfall was not previously identified by Thames Water and should be moved onto the Surface Water Outfall Programme. Its proximity to the Aldersbrook and Uphall Rec outfalls mean these could be combined into a single geographical area for investigations.

Table 19: Proposed actions per-organisation, alongside sort- and long-term solutions.

Organisation / Timeframe	Detail
Proposed actions and priorities per-organisation	
Thames Water	• SWOP investigations for the Aldersbrook, Uphall Rec and Ilford Hill Bridge outfalls should be conducted as a single programme of work. • Any faulty assets leading to sewage release via this outfall to be repaired.
Redbridge Council	• Enforcement of correction of misconnections.
Environment Agency	• Deployment of EA monitoring resources (sondes) for further investigation of pollution – a proposed location would be upstream / downstream of the series of problem outfalls identified in this report – Aldersbrook, Ilford Hill Bridge and Uphall Rec.
Proposed short- and long-term solutions	
Short-term solutions	• Misconnections resolved as a priority. Monitoring undertaken following this to determine if any further failures remain.
Long-term solutions	• Continuous monitoring of outfall to ensure that new asset failures or misconnections don't emerge.

5 Annexes

Annex A: Water Quality Considerations

Ammonia: parameter definition and measurement

Ammonia is used as an indicator for sewage pollution, therefore ammonia was the most common parameter monitored during this programme.

Hanna Checker medium and high-range colorimeters used in this monitoring programme use a colorimetric indophenol "blue" method that measures total ammonia nitrogen (TAN) — that is:

TAN = NH_3 (free ammonia) + NH_4^+ (ammonium)

These colorimeters therefore chemically measure all reduced ammonia forms, not just free ammonia (NH_3). However, for the purpose of brevity, this report will hereafter refer to total ammonia nitrogen as 'ammonia'.

Inter-tidal impact

Sample points downstream of Redbridge receive twice daily inundations of saltwater with the tide, this affects temperature and pH, and consequently can increase the proportion of unionised ammonia (NH3) and decrease the proportion of nontoxic ammonium ions (NH4+). All results for ammonia values used in this report fell above the threshold for 'Bad' in both low and high alkalinity waters, according to the Water Framework Directive (see **Table 3**). For this reason, samples taken during flooding tides are not differentiated from those taken during ebbing tides, given the consistently elevated levels of ammonia seen at all sample points analysed within this report. Future programmes undertaking more in-depth analysis would benefit from monitoring pH and temperature, or conductivity alongside ammonia to calculate the impact of saltwater inundation on ammonia values.

Annex B: Historical Maps of Outfalls Drainage Areas

Historical maps were reviewed to test the theory that the surface water catchments of several of these outfalls are in effect covered tributaries. All the below images are taken from the National Library of Scotland[17] and use historical OS maps.

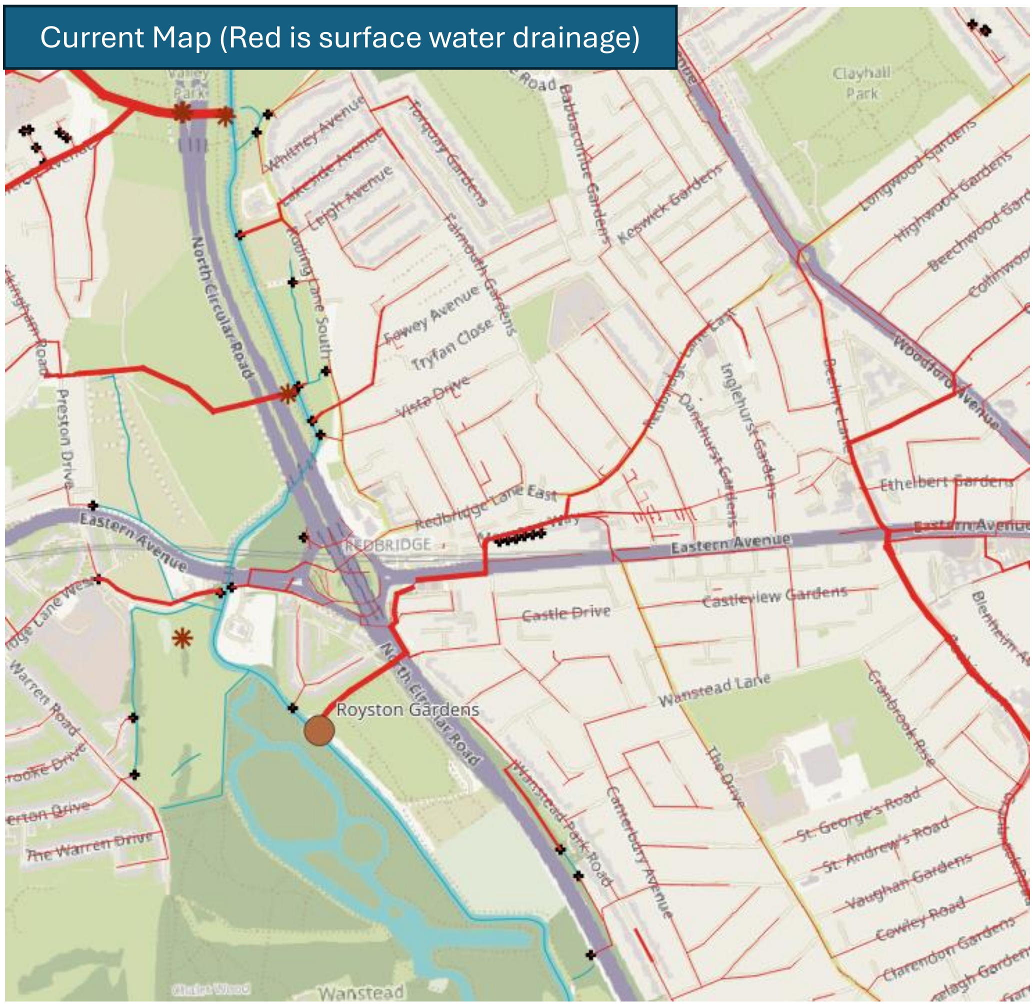
Royston Gardens

The following maps suggest that the Royston Gardens outfall takes water from a previously existing tributary or drainage ditch.

Older maps show a stream flowing into the old meander at Whiskers Island, further to the South East of the existing outfall (this old channel has been identified as a potential restoration site by the River Roding Trust). By the late 1960s, this watercourse no longer appears on Ordnance Survey maps,

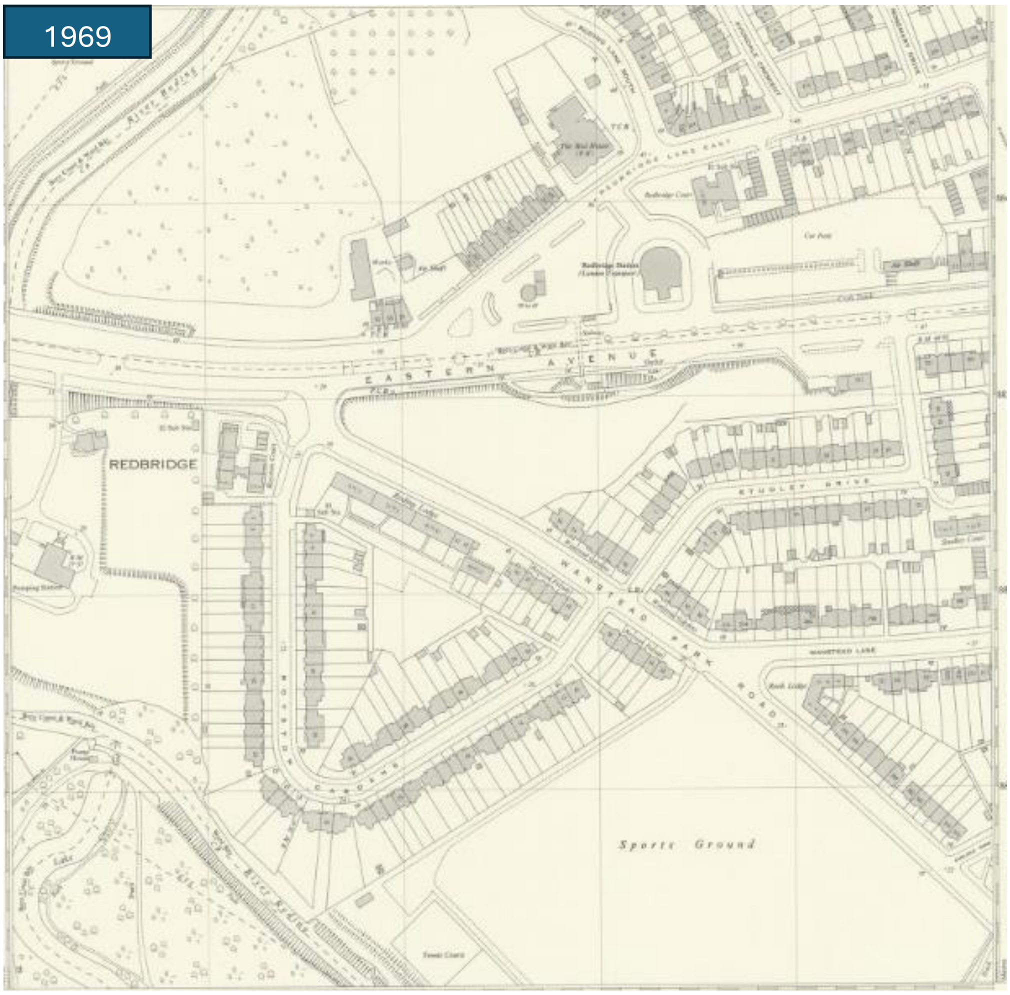
[17] https://maps.nls.uk/os/

suggesting that this has been instead culverted as present with a straight-line diversion across to the river.




1921
River Roding
Red Bridge
Old Red House (P.H.)
Redbridge Lane
Pumping Station (Met. Water Board)
Stonehall Farm
Gravel Pit
Wanstead Lane
The Heronry
Lincoln Island
Rook Island
The Grove
Grotto
ROMAN ANTIQUITIES found at various times
Stone
Highland Farm
The Drive
Golf Course


1946
AVONDALE CRES.
ELLESMERE GDNS.
Ch.
STUDLEY DRIVE
EVANSTON GDNS.
CASTLE ROAD
ROYSTON GARDENS
STONEHALL AVENUE
PRESTON GAR
WANSTEAD LANE
WORCESTER GDNS.
HEREFORD GDNS.
PETERBOROUGH GDNS.
RIPON GDNS.
WELLS GDNS.
WANSTEAD PARK ROAD
GLOUCESTER G
LINCOLN GARDEN
CANTERBURY AVENUE
CHELMSFORD
TRURO GDNS.
CHICHESTER
The Heronry
Lincoln Island
Rook Island
The Grove
Grotto



Roding Lane South

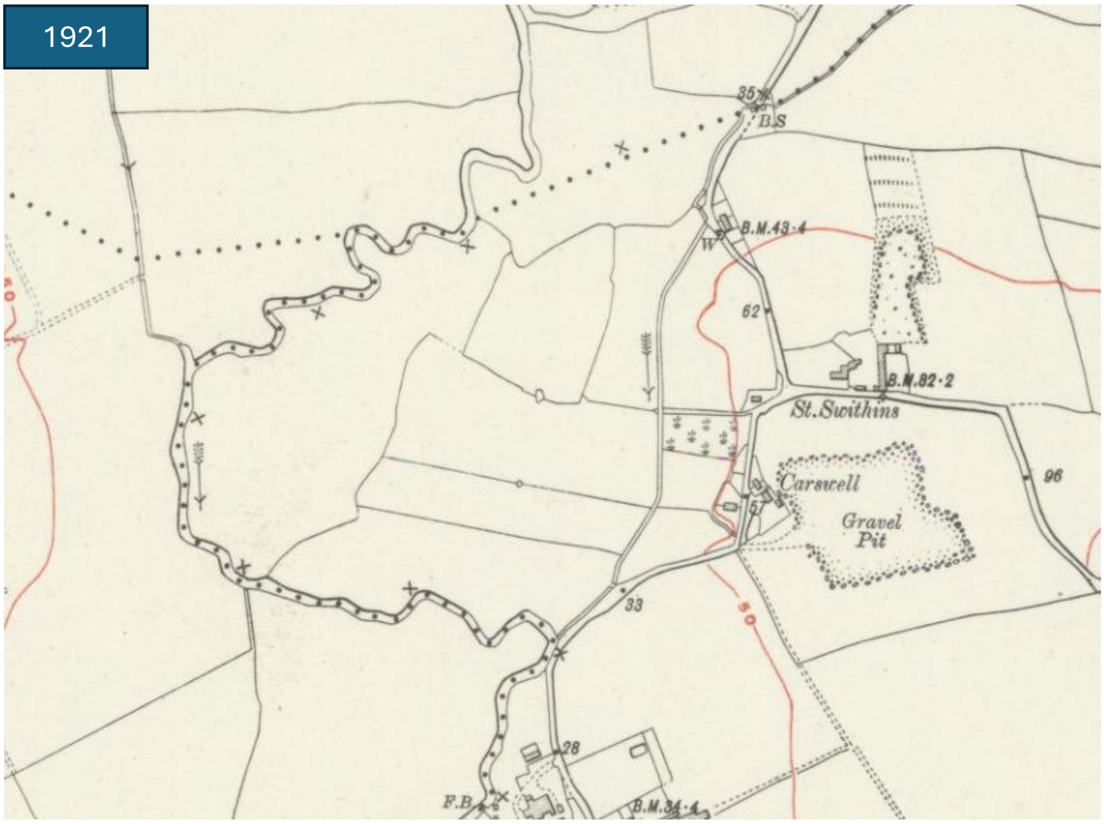
The following maps support the theory that the Roding Lane South outfall is in fact a covered tributary. This tributary (or drainage ditch) is shown joining the main Roding from the East in these pictures. In the last of these this is shown as an embanked channel sitting higher than the marsh area on the inside of the meander. This shows that the channel was diverted in the 1960s, so it must have been further diverted to the North and culverted sometime in the decades that followed.

The stub of the old tributary channel is still present and has been identified by the River Roding Trust as a potential future restoration site.

Current Map (Red is surfaces water drainage)

1896

1921


B.S
B.M.43·4
62
B.M.82·2
St. Swithins
96
Carswell
Gravel Pit
33
28
F.B.
B.M.34·4

1946


River Roding
Dispensary (Sick Animals)
Woodfordbridge Road
Carswell
Sports Ground
Pavilion
Foot Bridge
Parly. & Muni. Boro. Bdy.

Additional Documents Available Upon Request

The following documents support this report and are available upon request from Thames21:

1. Restoring the Cranbrook (Paul Powlesland 2025)
2. Thames21 MST eDNA Report (Seneye/Applied Genomics 2025)

3. FLOW feasibility study for Fairlop Waters wetland (Incoming)
4. Water Framework Directive Standards Methods Statement (Thames21 2026)
5. WaterBlitz Results- Comparison of Hanna Checker & Lab samples (Thames21 2025)