

Catchment Plan for Reach Lode

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Introduction

The aim is for this catchment plan to be a living document that is constantly evolving. It draws together the historic information, the current situation and detailed plans for work to preserve and enhance Reach Lode over the next 50+ years. A plan of such broad scope clearly involves a myriad of often competing human requirements ranging from the desire for wildlife habitat restoration/creation, the challenges of the built environment and the needs of farmers. Balancing of these themes and arriving at a document that is consensual and carries broad support is the ultimate aim.

Underlying facts

a) Geographic and geological details.

The Reach Lode system is ca. 7 km long and drains a ca. 6 km² catchment (see Figure 1). Reach Lode itself is ca. 3.5km long and is fed by a Catchwater Drain of a similar length that rises near Commercial End. Reach Lode is maintained by the Environment Agency as a navigable waterway. The Catchwater Drain is maintained by Swaffham Internal Drainage Board and runs through the Parishes of Swaffham Prior and Reach. The southern part of Reach Lode is within Reach Parish. The northern part of Reach Lode is bounded by Burwell Parish and Swaffham Prior Parish.

The Catchwater Drain is classified as a Type C spring-fed escarpment chalk stream but has been heavily modified. It is fed by many small Chalk springs and seepages along its length. The Catchwater Drain follows along the fen-edge in a northeasterly direction before feeding water into the top of the canal-like Reach Lode, which runs northwest and joins Burwell Lode close to Wicken Fen. Reach Lode runs at a level that is above the surrounding Fenland landscape.

Several of the small tributaries are also fed by Chalk groundwater. The Reach Lode System receives augmentation in the summer months from an outfall at Swaffham Prior House. Augmentation is not necessarily automatic and requires notification of the Environment Agency to start or increase the amount of water supplied when river levels get low in the summer. The augmentation is part of the Lodes-Granta scheme. In this case water is pumped from a borehole at New England Farm to the southeast. There is a Sewage Treatment Works (STW) at Swaffham Prior that discharges treated domestic effluent into the Catchwater Drain. Urban run-off enters the Reach Lode System at several points. There is a disused Sewage Treatment Works (closed 2012) at The Hythe, Reach. In addition, there is a water abstraction point on Reach Lode where the National Trust takes water in the winter months to keep the groundwater in its land holdings high for the benefit of wildlife (see Figure 2).

b) Historical overview of Reach Lode

Fowler (1933) and Astbury (1957) point out that the line of Reach Slade, an extinct Roman canal, runs adjacent and parallel to the western side of the modern course of Reach Lode from Reach to Upware [1] & [2]. The Hythe may overlie the approximate position of the Roman wharf or waterhead that served a nearby Roman settlement. There is a strong likelihood that the Devil's Dyke, a Saxon ditch and bank structure in that vicinity was re-modelled in the Medieval or later period to form the existing artificial peninsula and the lode banks that we see today [3]. Medieval Reach Port was a centre for commercial activity which by the 14th century had developed a more than local importance for trade in large quantities of locally quarried clunch, timber, iron and local agricultural products [4].

Map of the Reach Lode System hydrological catchment

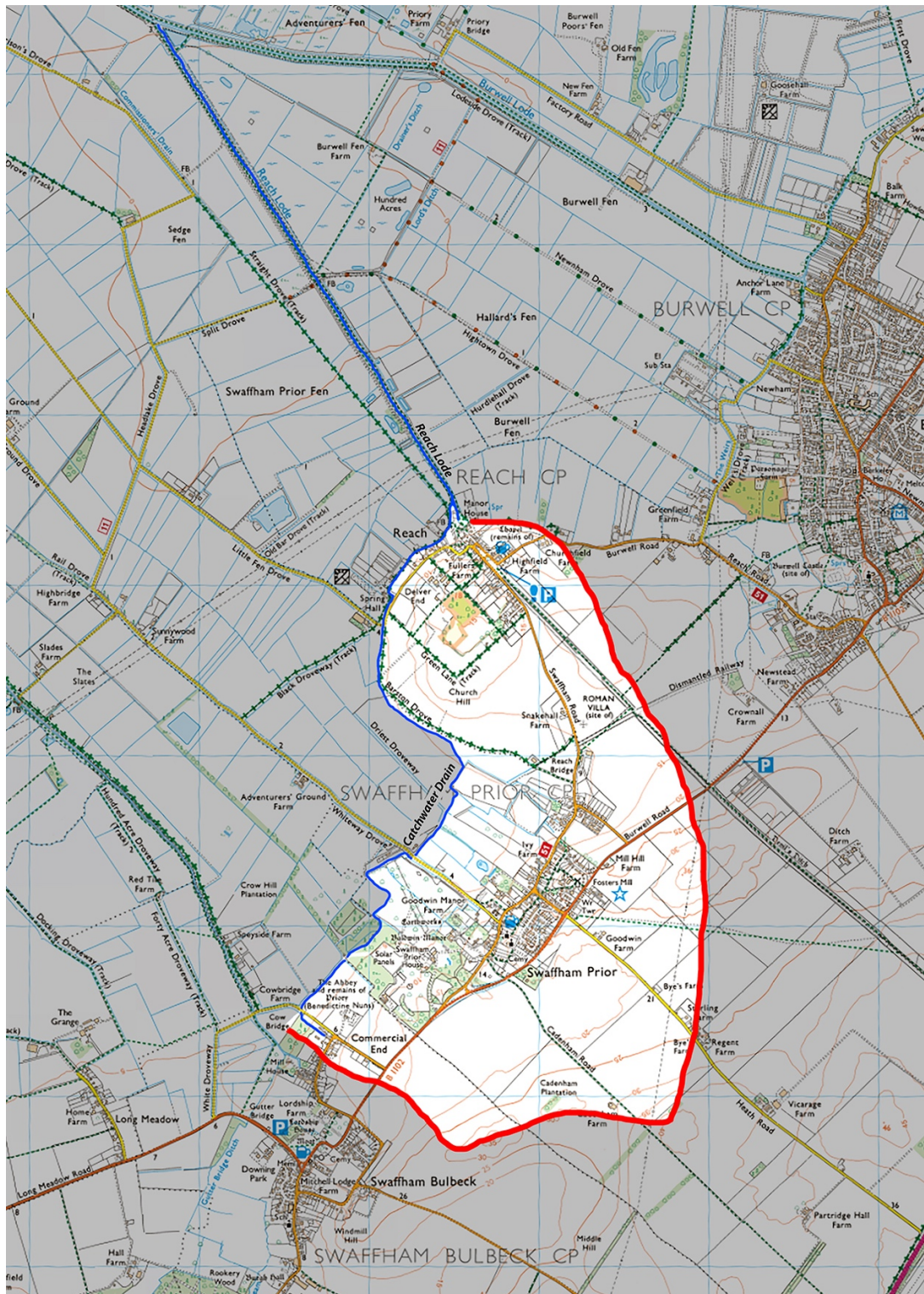


Figure 1 – Map of the Reach Lode 6km² hydrological catchment

Note that the map in Figure 1 shows the approximate theoretical hydrological catchment for the Reach Lode system. The catchment of the chalk aquifer feeding the chalk springs and seepages likely extends tens of kilometres to the southeast and cannot be accurately figured in this way. The Fenland to the northwest is drained by a separate system of drainage ditches.

c) Map of the Reach Lode System showing the main inputs.

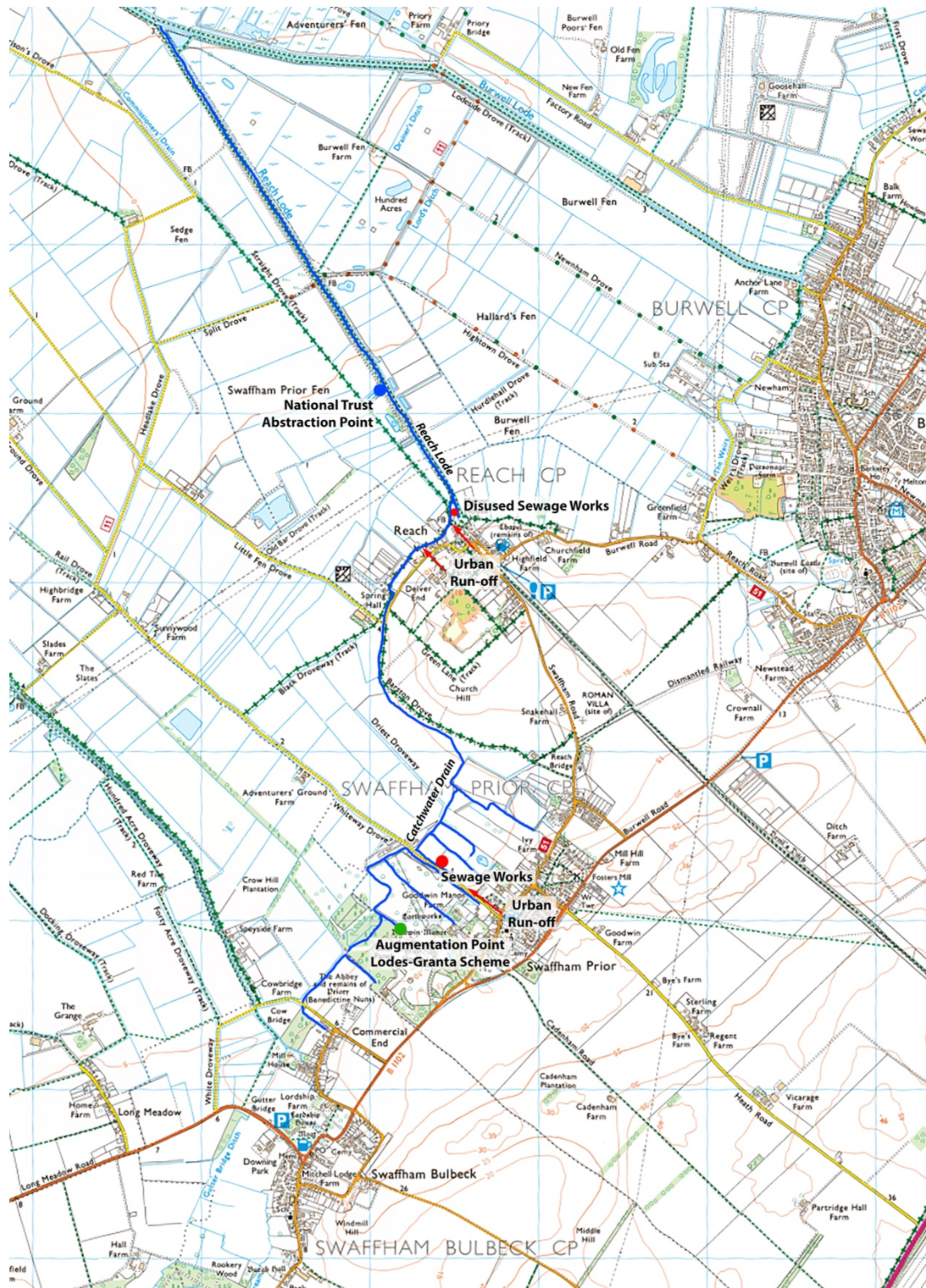


Figure 2 – Map of the Reach Lode system showing main inputs

The Catchwater Drain rises from several Chalk springs and seepages at the fen edge in the vicinity of Commercial End and Swaffham Prior. Urban run-off enters the Catchwater Drain from built-up areas in both Swaffham Prior and Reach villages.

d) Water Framework Directive Classification

According to the WFD classification [5] Reach Lode is a heavily modified watercourse. The Environment Agency consider it to be part of Burwell Lode for reporting purposes. In 2019 and 2022 its ecology was assessed as 'Moderate' and its water quality was assessed as 'High' quality.

Reach Lode WFD Classifications (cycle 3)

Classification Item	2019	2022
Ecological	Moderate	Moderate
Biological quality elements	Moderate	High
Invertebrates	High	High
Macrophytes and Phytobenthos Combined	Moderate	-
Phytobenthos Sub Element	Moderate	Moderate
Physico-chemical quality elements	High	High
Ammonia (Phys-Chem)	High	High
Dissolved oxygen	High	High
Phosphate	High	High
Temperature	High	High
pH	High	High
Hydromorphological Supporting Elements	Not High	Not High
Hydrological Regime	Does not support good	Supports good

The reasons for not achieving good WFD status are identified as the discharge from Swaffham STW, modification of the channel, run-off from roads and farmland, and the presence of Mercury and PFOS & PBDE 'forever chemicals', likely from urban and industrial sources.

Reasons for not achieving good status (RNAG)

Significant Water Management Issues	Activity	Category	Classification Element
Point Source	Sewage Discharge	Water Industry	Phosphate & Macrophytes/Phytobenthos
Physical modification	Land drainage, flood protection & recreation	Agriculture & land management	Mitigation Measures Assessment
Diffuse Source	Transport drainage & nutrient management	Agriculture, urban & transport	Mercury & Macrophytes/Phytobenthos
Unknown (pending investigation)	Unknown (pending investigation)	Sector under investigation	Perfluoro-octane sulphonate (PFOS) [industrial chemical]
Measures delivered to address reason, awaiting recovery	Not applicable	No sector responsible	Polybrominated diphenyl ethers (PBDE) [flame retardants]

e) Map of the Reach Lode System showing the main inputs.

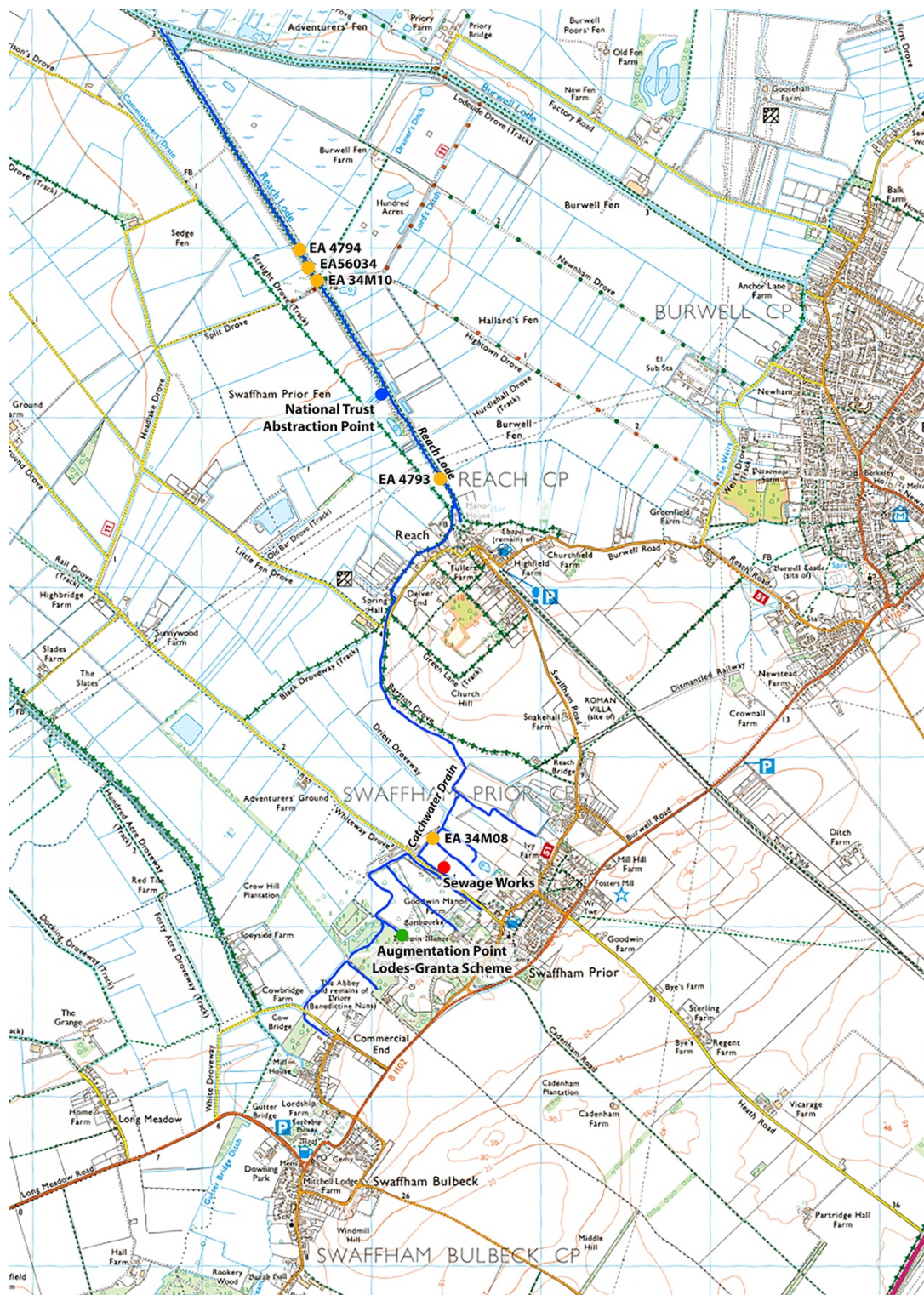


Figure 4 – Map of the Reach Lode system showing EA monitoring points

EA 34M08 on the Catchwater Drain only monitors Iron, which is presumably used at Swaffham Prior STW to sequester Phosphate in the final effluent. EA 4793 on Reach Lode near The Hythe, Reach monitored fish life and has produced a ‘High’ classification since 2011. There is a cluster of three monitoring stations (EA 4794, 56034 & 34M10) downstream of Reach Lode Bridge. Low Dissolved Oxygen has been a concern on some occasions, but fish life and invertebrates have gained ‘High’ status since 2011. Macrophytes have been assessed as ‘Poor’ or ‘Moderate’ at this location in the same period.

f) History of river work/projects on Reach Lode

The Lodes-Granta Scheme was set-up in the early 1990s to supply local headwaters with augmentation to compensate for water abstraction from the local Chalk aquifer. This caused Chalk groundwater levels to fall, resulting in springs and seepages drying up along the fen-edge. The augmentation scheme is now outdated and relies on reports by members of the public and Environment Agency staff to begin, change and cease the amount of water discharged at Swaffham Prior House. During the drought of 2018/19 and in summer 2025 despite augmentation the water level in Reach Lode fell to ca.25cm below normal with Dissolved Oxygen levels reaching less than 60% overnight in the Catchwater Drain at Reach. Low summer water levels are exacerbated to some extent by animal burrows causing leaks in the lode banks.

During times of high rainfall, the water level in Reach Lode can rise by ca.20cm. Water levels in the Reach Lode/Burwell Lode system are controlled by a pumping station at Upware discharging into the River Cam. Run-off from farmland and urban areas brings large amounts of silt into Reach Lode. Measurements on the Catchwater Drain in Reach show peak Turbidity of >50FTU equating to a Suspended Solids loading of >35mg/l. Suspended silt is known to settle in Reach Lode immediately to the north of Reach village and is re-suspended by passing vessels. Swaffham Internal Drainage Board (IDB) dredges the Catchwater Drain each year in February/March. Reach Lode is not maintained in this way by the Environment Agency. A sonar survey in September 2017 showed just 20cm of water beneath the boat keel in some sections. Plans to clear the siltation for the benefit of vessels using the navigation have not come to fruition.

The treated effluent from Swaffham Prior STW sometimes contains relatively high concentrations of Phosphate-P (>0.4mg/l) and Ammonia-N (>2mg/l) [6]. For comparison, measurements from the Catchwater Drain in Reach in September 2024 gave values of ca.0.1mg/l for both Phosphate-P and Ammonia-N. Eutrophication resulting in excess algal growth is clearly visible in Reach Lode during the summer months. Pollution by faecal coliform bacteria including *E. coli* is also present in the Catchwater Drain and Reach Lode. There is also occasionally evidence of herbicide run-off reaching the watercourse where macrophytes yellow and die-back.

Water quality logging in the Catchwater Drain in Reach 2023-24 showed moderate Electrical Conductivity (EC) in the range 750-850 μ S/cm, with Water Temperatures between 7 $^{\circ}$ C and 14 $^{\circ}$ C, and Dissolved Oxygen (DO) between 75% and 105% saturation. However, following heavy summer rainfall the EC often fell below 600 μ S/cm, temperatures rose and DO temporarily fell below 60%. Heavy rainfall in the winter washed de-icing salt into the watercourse, raising EC to >1100 μ S/cm and causing Water Temperatures to fall below 4 $^{\circ}$ C.

An eDNA study of Reach Lode by Cath Tayleur (NatureMetrics) in July 2021 revealed 13 species of fish including Pike, Perch, Ruffe, Roach, Rudd, Bream and the non-native Bitterling. It also hinted at Chalk stream species such as Bullhead, Stone Loach, Spined Loach and Brown Trout. The study also recorded Common Toad, Water Vole and more than a dozen bird species.

In March 2023 Swaffham IDB removed accumulated sediment from the Catchwater Drain banks in Reach village. This presented an opportunity to increase plant biodiversity with targeted sowing of wildflower seed. An N13F and N4F seed-mix was used in two experimental plots [7]. This resulted in an uplift in riparian plant Biodiversity in summer 2023 and 2024. Unfortunately, the drought of 2025 appeared to reverse this trend.

There are ongoing plans for the restoration of riparian communities on the Hythe, Reach.

Summary of Reach Lode - Overarching Catchment Themes

For the most part the Catchwater Drain and Reach Lode are bordered to the west by farmland, some of which belongs to the County Council Farm Estate. The National Trust owns a substantial area of land adjacent to Reach Lode north of Reach village. Swaffham Prior and Reach villages represent mixed-use urban areas dominated by residential properties. The Chalk Streams Restoration Strategy lists three essentials for a healthy watercourse. These are good flows, good water quality, and good channel shape.

a) Flows

Key pressures:

Groundwater abstraction (Anglian Water, Agriculture)

Augmentation failure (Environment Agency)

Flooding and drought (Urban run-off, Anglian Water, Landowners, Climate Change)

Anglian Water abstracts water from several boreholes within 6km to the southeast Swaffham Prior. In the summer and autumn months augmentation water is pumped from a borehole at New England Farm and discharged into a tributary at Swaffham Prior House. This supports the flow of the Catchwater Drain and Reach Lode. The augmentation is not automatically triggered and is limited to a maximum of 22 l/s. Augmentation is rarely continuous. A more reliable way to trigger and monitor flow is needed. Augmentation water dilutes the treated domestic effluent from Swaffham Prior Sewage Treatment Works.

Urban run-off reaching the system is of demonstrably poor quality. There is a need to mitigate this source of pollution with balancing ponds or wetlands where possible.

b) Water Quality

Key pressures:

Treated domestic effluent (Swaffham Treatment Sewage Works – Anglian Water)

Urban and Highway run-off (County Council, District Council, Parish Councils)

Silt and turbidity (Landowners, Climate Change)

The Water Framework Directive (WFD) Reasons for Not Achieving Good (RNAG) identifies treated domestic effluent from Swaffham Prior Sewage Treatment Works as a principal factor. Investment in the treatment process is needed to reduce phosphate and ammonia levels reaching the Catchwater Drain, and to future-proof it against residential development. Moving the treatment of raw sewage to a larger more modern works would be an attractive alternative.

Urban and Highway run-off presents a variety of water quality challenges to Reach Lode. These range from salt and silt-laden water from de-icing activities in the winter, to warm, low-oxygen water with high nutrient and faecal bacterial loadings in the summer. Run-off from farmland also contributes to silt loadings causing high turbidity within the water column. Suspended silt blocks light from water plants and chokes habitats. Interventions to trap silt before it can enter the water course would reduce the amount of fine-grained and organic material entering the system.

The Reasons for Not Achieving Good (RNAG) include diffuse pollution from Mercury, PFOS and PBDEs. Polyaromatic Hydrocarbons (PAHs), metals like copper and zinc, silt and microplastics from tyre wear are also present in highway run-off and are harmful to the aquatic environment. Even with limited space highway run-off can be treated using filter drains, wetland swales and separators before discharge into a watercourse [8].

c) Channel shape

Key pressures:

- Channel morphology
- Barriers
- Non-native invasive species

The whole of the Reach Lode system is artificial, designed to collect as much water as possible from Chalk springs and seepages (Catchwater Drain) and as a navigation (Reach Lode). It seems unlikely to achieve ‘Good’ status for the ‘physical modifications’ category of the WFD. Reach Lode is essentially a linear pond, but upstream the Catchwater Drain has at least some features of a classic Chalk Stream. It is here that some habitat restoration might be possible.

There is a navigable lock at Upware where vessels can pass between Burwell Lode and the River Cam. This means that theoretically, plants, fish and other animals can pass between the two. The potential for the lock to act as a barrier to fish movement is unknown.

The non-native Bitterling and the predatory non-native Zander are known from Reach Lode. American Signal Crayfish (ASC) have invaded many tributaries of the River Cam but have not yet been recorded in Reach Lode. ASC are known to burrow into banks releasing suspended silt into the water, and as such represent a risk to Reach Lode where it flows above the level of the surrounding Fenland. Monitoring for the presence of invasive species is an important part of the Catchment Plan going forward.

People

The majority land in the Reach Lode system catchment comprises arable farmland. It is well-established that best practice regarding pesticide and fertiliser use benefits farmers as well as the environment. Buffer habitat strips adjacent to water courses help to reduce soil erosion and the impact of farming activities.

Human activities in urban areas such as pesticide use, washing of vehicles and use of de-icing salt have a large potential to cause poor water quality within Reach Lode. In addition, urban areas often have misconnections and leaking sewers that allow sewage to reach surface water drains. Public access along Reach Lode and parts of the Catchwater Drain is very good. However, parts of the Catchwater Drain are inaccessible.

The short-term plan for the next 2 years

Title	Details	Project lead	Status	Funded	Start date
Treated Sewage Effluent	Improvement of effluent quality.	Anglian Water	Proposed		
Augmentation	Improvement of augmentation triggering and monitoring	Environment Agency	Proposed		
Reach Lode Interventions	Catchment-wide habitat interventions		Proposed		
Balancing Ponds and Wetlands	Balancing Ponds and Wetlands feasibility		Proposed		

List of Stakeholders

The co-ordinator of the Reach Lode Catchment Plan is – Steve Boreham

If you know of an individual or organisation that is not yet involved but you think should be, let the co-ordinator of the Reach Lode catchment plan know.

- Reach Parish Council
- Great Ouse Boating Association
- Swaffham Internal Drainage Board
- East Cambridgeshire District Council
- Cambridgeshire County Council (highways and landowners)
- Burwell Parish Council
- Swaffham Prior Parish Council
- Environment Agency
- Anglian Water
- National Trust
- NGOs: community groups, conservation charities
- Businesses
- Landowners: Individuals, Farmers
- Other interested parties

Wildlife

The aim is to improve habitats throughout the Reach Lode catchment. Reach Lode supports chalk stream plants such as Water Starwort, a range of invertebrates including mayflies, damselflies and caddisflies, fish such as Three-spined Stickleback, Roach and Perch, birds including Kingfisher, Mute Swan, Heron and Little Egret, and mammals including Water Vole and Otter.

The Future

The strategies associated with managing Reach Lode over the next 50 years involve a myriad of competing human desires ranging from habitat restoration/creation and a reduction in pollution to improved access along the Catchwater Drain and Reach Lode, and to the landscape that surrounds it. These are pitched against increased development pressure for housing, farming and business, which represent challenges to the Reach Lode corridor and to water quality.

Balancing these issues and arriving at a strategy that is consensual and carries broad support is the aim of this plan. In the medium term (3 to 10 years ahead) the focus is to identify areas and issues that could be improved or mitigated to deliver a significant positive impact on the Reach Lode corridor. It is worth noting that the Environment Agency considers improvements in the ecology, hydrological regime and run-off 'disproportionately expensive' to mitigate in the period up to 2027. They also report that improvements in chemical water quality are 'technically infeasible' in the period up to 2063 [5].

Regardless, it would be good to see initiatives to increase biodiversity, a reduction in local chalk groundwater abstraction, an increase in augmentation quantity and reliability, and the creation of balancing ponds on most of the run-off inputs to attenuate pollution and flood risk. The long-term perspective (25 to 50 years ahead) would be to maintain Reach Lode as an exemplar of a Fenland Lode, maintaining good water quality and a biodiverse green corridor leading towards the River Cam, and a fine example of an historic man-made watercourse. This would require proactive monitoring of conditions in and around Reach Lode and a presumption against development on greenspace within the catchment.

References

- 1] Fowler, G E 1933, Fenland waterways, past and present. South Level District. Part I. *Proceedings of the Cambridge Antiquarian Society*, 33, 108–128.
- 2] Astbury, A K 1957, *The Black Fens*. Cambridge: The Golden Head Press.
- 3] The case for reclassifying The Hythe, Reach, Cambridgeshire as a site of historic and archaeological significance. Boreham, S., Moseley C. and Boreham J. (2016) *Proceedings of the Cambridge Antiquarian Society*. 105, 61-64.
- 4] RCHM 1972, *An Inventory of the Historical Monuments in the County of Cambridgeshire, Volume 2, North-East Cambridgeshire*. London: Royal Commission on the Historical Monuments of England.
- 5] [<https://environment.data.gov.uk/catchment-planning/WaterBody/GB105033042720>]
- 6] [<https://environment.data.gov.uk/water-quality/sampling-point/AN-SWAFFPR>]
- 7] [<https://www.naturescape.co.uk/product/n13f-chalk-limestone-soils-mix-flowers-only/>]
- 8] [<https://www.stormwatershepherds.org.uk/wp-content/uploads/2024/05/Highway-runoff-and-the-water-environment-report-combined-LR.pdf>]