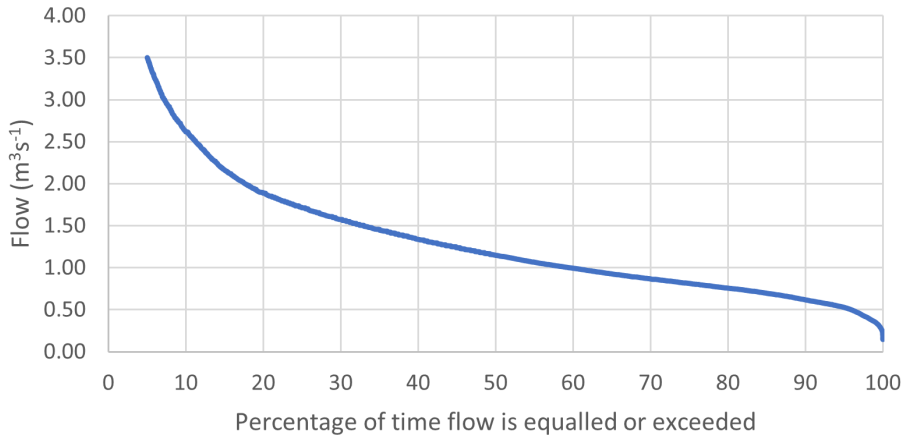


Flow Duration Curve for River Lark at Turf Lock, scaled from the Temple (1960-2021)



**PRELIMINARY ECOLOGICAL APPRAISAL
OF THE TURF LOCK, RIVER LARK, MILDENHALL, SUFFOLK
A Report prepared for: Environment Agency**

Date: 23rd April 2024

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Notice

This report has been prepared by M&H Ecology Limited for the sole and exclusive use of the Client. The information which M&H Ecology Limited has provided has been prepared by an environmental specialist in accordance with the Code of Professional Conduct of the Chartered Institute of Ecology and Environmental Management. M&H Ecology Limited confirms that the opinions expressed are our true and professional opinions based on the information supplied to M&H Ecology Limited.

M&H Ecology Limited

This document has 25 pages including the cover.

Document Control:

Client		Environment Agency		
Site Name		Turf Lock		
Site Location		Mildenhall, Suffolk		
Issue	Revision	Description	Date	Signed
1	0	Final	23/04/2024	Julia Massey

Executive summary

This report has been prepared by M&H Ecology Limited on behalf of the Environment Agency to undertake a Preliminary Ecological Appraisal (PEA) at Turf Lock and the adjacent woodland at NGR: TL 70831 74252.

The PEA was written to identify ecological constraints to the proposed scheme and recommend further surveys, if deemed to be necessary. The report also includes recommendations for avoidance measures or proportional mitigation and compensation measures to reduce and / or avoid impact to the ecological receptors noted on site. Furthermore, enhancement measures are outlined in Section 5.

Further surveys have been identified for water vole and otters to be carried out in spring 2024. Mitigation measures have been carried out for birds and bats; further mitigation may be necessary for birds and bats in the form of avoidance measures. The recommendations are outlined in Section 5 of this report.

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1.0 INTRODUCTION

1.1 Project Background

This report has been prepared by M&H Ecology Limited on behalf of the Environment Agency (EA) to undertake a Preliminary Ecological Appraisal (PEA) at Turf Lock along the River Lark and land adjacent to the river in Mildenhall, Suffolk. The National Grid Reference (NGR): TL 70831 74252 (**refer to the location map in Appendix A**). The appraisal was carried out on the 7th March 2024.

For the purpose of this report hereafter the survey and proposed works will be referred to as the Site. The scheme will involve constructing a fish pass at Turf Lock and ancillary works including the access route and compound.

1.1.1 Turf Lock Fish Pass

The Turf Lock is a remanant `pound lock` which was used to lower or raise boats between different water levels. Nowadays the lock operates as a weir, and as a result of the current function, creates a barrier for migratory species, such as fish and eels, to complete their lifecycle. The fish pass will provide continuity of the river corridor to enable species to thrive. The scheme will include the following elements:

- Create a rip-rap rock ramp constructed from boulders embedded into concrete. Furthermore, cobbles will be embedded within the concrete to create `roughness` over the smooth surface of the concrete.
- The large pool, between the upper and lower weirs, will be infilled with rip-rap and earth.
- Temporary works include the access track and compound within the wooded area. The vegetation clearance for the temporary works were carried out in March 2024. Refer to the locaiton map in Appendix A and photographs one and two in Appendix C.

Please note: An initial assessment was carried out in late-January 2024 to determine the impact of the vegetation clearance works for the purpose of creating the access route and compound location (M&H Ecology Ltd, 2024).

1.2 Site Description and Context

The Site is located along the River Lark within Mildenhall, Suffolk. The immediate surrounding area is residential with a public footpath along the right (northern) bank along the bank top. A woodland is located along the right bank immediately downstream of the lock, the Mildenhall Cricket Club is adjacent to the woodland, dissected by the public footpath (heading in a northerly direction from the river bank). Immediately downstream of the lock the banks of the river channel consists of mature trees, with some self-set trees. **Refer to the location map in Appendix A.**

1.3 Objective of the Ecological Survey

The report is informed by a desk top study and a field survey in order to determine the presence of, or potential for, ecologically sensitive receptors i.e., wildlife species and/or habitats, in or near the proposed working footprint. The information is used to determine the approach necessary to ensure that the effects on these ecologically sensitive receptors are avoided or ameliorated such that the proposed development will be acceptable with reference to the planning and legal framework relating to ecological receptors and providing a conservation net gain for the species.

2.0 METHODOLOGY

This report has been produced based on the *Guidelines for Preliminary Ecological Appraisal 2016* (CIEEM, 2017). It includes an assessment of the Site's habitats as to their likely importance for protected or notably important species in accordance with the following legislation: The Conservation of Habitats & Species Regulations 2017, the Wildlife & Countryside Act (as amended) 1981, the Protection of Badgers Act 1992 and the NERC Act 2006. **A summary of the planning policies are in Appendix D, and the primary legislation is listed within Appendix E**

2.1 Desk Top Study

To provide contextual background to this project, a desk study has been undertaken to search for protected and important species and habitats within a two-kilometre radius of the Site (NGR: TL 70831 74252). The 'study area' is considered appropriate for the scale of the proposed works and adheres to best practice guidance. The desk top study was conducted using online sources such as Magic Map in combination with data obtained from the Suffolk Biodiversity Information Service (SBIS). The data was obtained from the SBIS in January 2024. **Refer to the desk top data map in Appendix B.1.**

2.2 Field Survey

The PEA comprised a desk study and site survey undertaken on the 7th March 2024 by Julia Massey CEnv MCIEEM of M&H Ecology Limited. The weather during the survey was cloudy with a temperature of approximately 10° C.

It is worth noting that this assessment is based on the presence of suitable habitat to support such species and not on qualitative species-specific surveys. Where the potential for protected or important species have been identified, further species-specific surveys are necessary to be confident of either a positive or negative conclusion as to the presence of protected or important species on the Site.

2.2.1 Suitably Qualified Ecologist

Julia Massey has over 22 years professional experience as an ecologist. She is a Chartered Environmentalist and a full member of the Chartered Institute of Ecological and Environmental Management (CIEEM). She holds numerous water vole mitigation licences, class licence for water vole displacement (CL31 licence number: 2016-00008-CLS-CLS), an accredited agent on the Environment Agency's organisational licence and the IDB's class licence (CL24 licence number: 2023-00016-CLS-CLS). She also holds a class 1 bat licence (licence number: 2017-27549-CLS-CLS).

2.3 Survey Limitations

As the survey was carried out in March it is outside of the optimal survey season which may have resulted in some plant species not being noted. However, the survey has recorded an accurate account of the habitat and likely species that were present within the Site. This is based on a combination of the site survey and the data obtained via the desk top study.

Limited access to the river channel. However, the water vole and otter survey was carried out from within the channel (by boat). Refer to the separate report (to be written in May 2024 by M&H Ecology Ltd).

3.0 RESULTS

The ecological baseline conditions of the PEA for the Site are summarised in the sections below and supported by the **survey map in Appendix B.2 and the photographs in Appendix C.**

3.1 Designated sites

3.1.1 Statutory Designated Sites

Breckland Forest Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI) and are located approximately 1km east of the Site. The site is noted for breeding birds such as the woodlark (*Lullula arborea*) and nightjar (*Caprimulgus europaeus*) of which are both of European importance noted under the SPA designation. The SSSI supports important assemblages of both plants and invertebrates. The most significant threats to the notifiable features of both the SPA and SSSI are deemed to be associated with localised activities such as trampling cause by recreational activities, management i.e., reducing scrub encroachment and tree felling. **Therefore, due to the distance from the Site and the nature of the scheme the Breckland SPA and SSSI will not be considered any further within this appraisal.**

3.1.2 Non-statutory (Locally) Designated Sites

The Norah Hanbury – Kelk Memorial Meadows is noted as a Suffolk County Wildlife Site (CWS) is located approximately 500 metres from the Site adjacent to the River Lark, at NGR: TL 71339 74243. The lowland meadow comprises of a combination of comparatively dry calcareous to wet and peaty soils closer to the river. Of particular interest is a colony of early marsh orchid (*Dactylorhiza incarnata*). Due to the nature of the scheme there will be no impact to the CWS i.e., the water levels will not change. **For this reason the CWS will not be considered any further within this appraisal.**

The Worlington Golf Course CWS is located approximately 600m south-west of the Site, at NGR: TL 70553 73870 The CWS is primarily designated for lowland dry acid grassland supporting diverse range of species including nationally rare species such as the Spanish catchfly (*Silene otites*) and bastard toadflax (*Thesium humifusum*). One of the most significant threats to lowland acid grasslands (and heathland) is air pollution, such as nitrogen deposition. Due to the nature of the scheme and the distance from the CWS there will be no impact to the CWS. **For this reason the CWS will not be considered any further within this appraisal.**

Refer to the designated sites map in Appendix B.1.

3.2 Habitats

The Phase 1 habitat survey was undertaken in accordance with standard methodology (JNCC, 2010). The Phase 1 methodology involves the classification of habitat types based on vegetation present. The Site was classified into areas of similar botanical community types, with a representative species list provided for each habitat type identified.

Habitats identified during the Phase 1 habitat survey are detailed below in alphabetical order (not in order of ecological importance):

- Broadleaf woodland and shrub
- Semi-improved Grassland
- River

3.2.1 Broadleaved Woodland

The broadleaved woodland is located approximately 50 metres north of Turf Lock and encompasses 1.6 ha. The deciduous woodland is noted as a Priority Habitat under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. The parcel of land will include the temporary elements of the scheme, namely the access route and compound. The northern area of the woodland consists primarily of common beech (*Fagus sylvatica*) with occasional English oak (*Quercus robur*), with an understorey including hawthorn (*Crataegus monogyna*), bramble (*Rubus fruticosus*) and elder (*Sambucus nigra*). The ground flora was dominated by common nettles (*Urtica dioica*) and frequent cuckoo pint (*Arum maculatum*). The mid-section consisted of occasional sycamore (*Acer pseudoplatanus*) and white poplar (*Populus alba*), which became more dominated south towards the

River Lark. The lower eastern section (closest to the houses) crack willow (*Salix fragilis*) were the dominant tree species including occasional common alder (*Alnus glutinosa*) along the bank top of the Mill Leat. The ground flora was dominated by common nettle. Common ivy (*Hedera helix*) was noted growing on a number of trees.

There were dense stands of buddleia (*Buddleja davidii*), also known as `butterfly bush`, within the mid-section of the woodland. Although buddleia is not a notifiable species under Schedule 9 (invasive species) of the Wildlife & Countryside Act 1981 (as amended) it is invasive in nature. However, it does provide a nectar source for invertebrates. **Refer to the Target Note 2 in the phase 1 habitat map in Appendix B.2 and the photographs three and four in Appendix C.**

3.2.2 Semi-improved Neutral Grassland with Scattered Shrubs

The mid-section along the eastern boundary comprised of semi-improved grassland, with scattered shrubs such as buddleia, elder (*Sambucus nigra*) and brambles. The approximate area of grassland was 0.12ha. The grass and herb species noted was dominated with cock's foot (*Dactylis glomerata*), including frequent of Yorkshire fog (*Holcus lanatus*), false oat grass (*Arrhenatherum elatius*), perennial ryegrass (*Lolium perenne*) and meadow fescue (*Schedonorus pratensis*). The herbs present were mullein (*Verbascum Thapsus*), oxeye daisy (*Leucanthemum vulgare*), yarrow (*Achillea millefolium*) and ribwort plantain (*Plantago lanceolata*). **Refer to photograph five in Appendix C**

3.2.3 River Lark

The river channel has historically been modified with structures and over-widened, therefore, lost some of the historic chalk river features. Chalk streams are noted as a Priority Habitat under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. The river through this section flows through the edge of Mildenhall, with residential area along both banks (upstream of the lock). The residential area continues along the left bank downstream of the lock; a short wooded section is and the Mildenhall Cricket Club are located along the right bank. A public footpath runs along the top of the right (eastern) bank. The channel within the locality of the lock, particularly downstream, is partly shaded by a mixture of self-set trees such as sycamore (*Acer pseudoplatanus*), with common nettles dominating the bankside vegetation, with frequent common ivy and occasional white-dead nettle (*Lamium album*) along the right bank. A mature ash (*Fraxinus excelsior*) with dense brambles were noted on the left bank (adjacent to the lock). Upstream of the lock there are occasional self-set alders. The bankface is mostly bare earth at the time of the survey, this may be as a result of the footpath which appears to have been upgraded relatively recently (refer to photograph six) . The in-channel vegetation is limited downstream to short unshaded sections, consisting of reed sweet-grass (*Glyceria maxima*). **Refer to photograph seven in Appendix C.**

The mill leat flows along the edge of the woodland initially (for approximately 50m), thereafter through residential areas along both banks upto the mill. The channel is silty with marginal vegetation consisting of reed sweet-grass, brooklime (*Veronica beccabunga*), water plantain (*Alisma plantago-aquatica*), water mint (*Mentha aquatica*), fool's watercress (*Apium nodiflorum*), water startwort (*Callitriche Spp.*) and segdes (*Carex Spp.*). Occasional fallen trees and tree boughs were noted in the channel. **Refer to the photographs eight in Appendix C.**

3.3 Species

Both protected and important species have been noted within the 2km data search, and there is a potential that the habitats on Site and in the immediate surrounding area potentially support these species.

3.3.1 Flora

Although the survey was carried out in early-March 2024, post the optimal botanical survey season, there were no notifiable flora species noted within the desk top study within the zone of influence. Furthermore, the Site is primarily species poor grassland. **For this reason floral species will not be considered any further within this appraisal.**

3.3.2 Non-Native Invasive Species

American signal crayfish (*Pacifastacus leniusculus*) were noted in the desk top study and during the survey. It is an offence under Schedule 9 of the Wildlife & Countryside Act 1981 (as amended) to return signal crayfish to the watercourse. **Due to the presence of the non-native species refer to the recommendations within Section 5.1.**

Muntjac deer (*Muntiacus reevesi*) was noted within desk top study and throughout the survey, particularly within the eastern section of the site. It is an offence under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) to not release or allowed to escape into the wild.

3.3.3 Reptiles

The Site currently provides potential habitat for foraging and hibernating such as scrub, trees, log piles and a limited area of rough grassland within the Site. However, the surrounding gardens primarily consist of short sward in addition to the regularly mown grass at the adjacent Mildenhall Cricket Club. Therefore, limited connectivity to the wider environment i.e., the footpath along the bank top of the River Lark is maintained to a short sward within the boundary of the cricket club (west of the Site). The desktop study indicates that reptiles are noted within the wider environment i.e., over 300m to the south of the Site. Downstream of the Site the river and bankside vegetation will (potentially) provide suitable habitat for grass snakes (*Natrix natrix*). However, the downstream section will not be impacted by the scheme. **Therefore, for these reasons reptiles will not be considered any further within this Appraisal.**

3.3.4 Great-crested newts

There were no records of great crested newts (*Triturus cristatus*) noted within the desk top data search. Although the woodland would potentially provide hibernating habitat there is not connectivity to the wider environment due to the limited habitat, roads and the River Lark is inhabited by fish and therefore unlikely to be suitable for great crested newts. **For this reason great crested newts will not be considered any further within this appraisal.**

3.3.5 Birds

The Site supports bird nesting habitat in the form of scrub, shrubs and trees. Furthermore, the local residential areas immediately adjacent to the Site provided numerous opportunities for birds to forage and the provision of bird feeders. The desk top data study highlighted numerous species of birds within the search area (within the wider area of the Site). Several bird species were noted during the survey such as blackbird (*Turdus merula*), wren (*Troglodytes troglodytes*), greenfinch (*Chloris chloris*), great tit (*Parus major*), grey wagtail (*Motacilla cinerea*), wood pigeon (*Columba palumbus*) and house sparrow (*Passer domesticus*). A tawny owl (*Strix aluco*) box was noted during the survey. However, there was no evidence of use i.e., no pellets or droppings were noted within the locality of the box. **Refer to Target Note 1 in the phase 1 habitat map in Appendix B.2 and the photograph nine in Appendix C. Refer to the recommendations for nesting birds in Section 5.2.**

It is worth noting that vegetation was cleared prior to the bird breeding season for the purpose of the temporary works i.e., the access route and compound / storage areas. Refer to the letter report produced by M&H Ecology in January 2024.

3.3.6 Bats

Bat species are known to be present within the search area i.e., there were 87 records noted within the desk top study search area of 2kms and the Site will provide suitable foraging and roosting opportunities and potential roost sites. **Refer to the recommendations within Section 5.3.**

3.3.7 Badgers

There were no obvious badger (*Meles meles*) signs noted during the survey. The survey concurs with the desk top study, no records were noted within the desk top study. **For this reason badgers will not be considered any further within this appraisal.**

3.3.8 Otters

There were otter (*Lutra lutra*) signs noted during the survey although there was limited access to the river the signs (spraint) were noted immediately upstream of the lock structure (right bank), refer to Target Note 4 and photograph 10. There were 10 records noted within the desk top study within the wider environment. **Refer to the recommendations within Section 5.4.**

3.3.9 Water Voles (*Arvicola amphibius*)

The section surveyed provided limited suitable habitat for water voles within the immediate vicinity of the lock. However, the habitat is considered to be potentially suitable within the mill leat and downstream of the lock. The desk top study indicated that there were three records with the most recent record present in 2016. Although it is worth noting that the desk top study may not include all survey effort or that surveys have not been undertaken for many years. **Refer to the recommendations within Section 5.5.**

3.3.10 Hedgehogs (*Erinaceus europaeus*)

There are numerous records of hedgehogs within the desk top data. Hedgehogs are noted as a Species of Principle Importance under Section 41 of the NERC Act 2006. There were no hedgehogs noted during the survey, although parts of the woodland and adjacent gardens (if connected) will potentially provide suitable foraging and shelter habitat for hedgehogs. **For this reason hedgehogs will not be considered any further within this appraisal.**

3.3.11 Invertebrates

The habitats were not considered of importance to notable aquatic or terrestrial invertebrates in the locality. This concurs with the limited records noted within the desk top study. **For this reason invertebrates will not be considered any further within this appraisal.**

3.3.12 White Clawed Crayfish (*Austropotamobius pallipes*)

The survey confirmed the presence of the American signal crayfish. This concurs with the desk top study. The white clawed crayfish has not been present within the River Lark for many years due to the presence of the American signal crayfish. **For this reason white clawed crayfish will not be considered any further within this appraisal.**

3.3.13 Hazel Dormouse (*Muscardinus avellanarius*)

The habitats present are not considered to support the preferred habitat for the hazel dormouse. The site survey concurs with the results of the desk top study. **For this reason the hazel dormouse will not be considered any further within this appraisal.**

4.0 DISCUSSION

Overall the Site (and immediately adjacent) currently provides some ecological interest for local and nationally important species; providing habitat for a range of species such as birds and mammals i.e., bats, otters and water voles. The recommendations below provide outline mitigation for the species noted.

5.0 RECOMMENDATIONS & ENHANCEMENTS

The recommendations outlined below are based on the information that M&H Ecology have received from the desk top study (the data obtained from the SBIS in January 2024) and the survey carried out on the 7th March 2024.

5.1 Non-Native Invasive Species

Ensure that biosecurity measures are in place due to the presence of invasive species on site i.e., adhere to the Check-Clean-Dry procedure

- If American signal crayfish are found during the work they should be humanly disposed of and not returned to the watercourse. Please note that it is an offence under the Wildlife & Countryside Act 1981 (as amended) to return signal crayfish to the watercourse.

5.2 Birds

Based on the legal protection, any clearance of, or disturbance to potential nesting habitat (scrub, marginal vegetation and trees) should ideally be undertaken outside of the bird nesting season i.e., the bird breeding season is considered to be between March-August inclusive, or within 24 hours following confirmation by a suitably qualified ecologist that no active nests are present (including the building of a nest).

Vegetation clearance was carried out for the temporary works in March 2024. To maintain the vegetation to ground level the site will be inspected and strimmed to deter birds (and other) species from colonising the access route and compound / storage area.

5.3 Bats – Further PRF Required

The initial vegetation clearance carried out in March 2024 an assessment was carried out in late-January 2024. The trees (white poplar) identified for removal were assessed for potential roost features (PRF): two trees had no PRF noted and a stem from the third tree had ivy present, although the ivy growth is deemed to be `light`, therefore `soft-felling` is recommended, refer to Target Note 3 and photograph 11. The ivy was cut at the stem to allow the ivy to die back gradually to enable a further assessment for PRF prior to undertaking the soft-felling.

5.4 Otters – Survey Required

Based on the signs noted to date i.e., spraint within the locality of the lock structure indicates that the otter is bypassing the structure. A survey is required to determine whether there are couches / resting – up sites present and also to determine how the otter is utilising the area within the locality of the structure. The proposed fish pass will (hopefully) enable the otter to utilise the section from within the channel rather than bypassing the structure, as this appears to be the current passage for the otter.

The survey was carried out in April. Refer to the separate Water Vole and Otter Report written by M&H Ecology (to be issued in mid-May 2024). Further mitigation will be required in the form of a sensitive working method statement to ensure that the works do not impact the otter or their habitat.

5.5 Water Vole – Surveys Required

Based on the information received to date it will be recommended that a water vole survey is carried out to undertake an assessment of whether water voles are present within the working footprint (and adjacent habitat).

The survey was carried out in April. Refer to the separate Water Vole and Otter Report written by M&H Ecology (to be issued in mid-May 2024). No further mitigation measures will be necessary for water voles.

5.6 General Mitigation

- Any trenches and/ or holes created during the construction phase must either be covered at night (and weekends) or an access route provided to ensure that no species are trapped within the trench. For example, a scaffolding plank can be used.
- Avoid working at night if possible i.e., if the scheme runs into autumn / winter there will be a higher risk of working at dusk increasing the likelihood of requiring lighting. If lighting is required a lighting plan must be produced to ensure that bats and their habitats are protected. For example, avoid using lighting in key habitats and features where bats are present and apply methods to reduce lighting to agreed limits in sensitive locations. Ensure that the lighting plan (if required) complies with the Bat Conservation Trust`s Guidance Note: GN08/23 – Bats and Artificial Lights at Night.
- Ensure that stringent biosecurity measures are in place due to the presence of invasive species on site i.e., adhere to the Check-Clean-Dry procedure
- All works must ensure that appropriate pollution prevention measures are adhere to that comply with the principles of the now withdrawn Pollution Prevention Guidance (PPG5)
- Toolbox talks to be delivered in relation to the ecological receptors noted on site. The toolbox talk should include legal protection, description of the species, habitat type that the species utilise, best practice working methods and the ecologist`s contact details.
- Ecological Clerk of Works (ECoW) to be appointed during the construction phase of the works.

5.7 Enhancements

On completion of the works once the woodland area is reinstated the works should include the planting of suitable species to enhance the area for the in situ species such as nectar rich plant species to improve the ground flora diversity and also consider improving the understorey and field layer of the woodland. This should be agreed with the NEAS Landscape Architect and the ECoW.

Installation of bird and bat boxes within the woodland.

Additional creation of log piles. Please note that log piles were created during the initial vegetation clearance in March 2024.

There are potential opportunities to install pre-established coir rolls downstream of the lock (along the right bank) to provide toe protection, thereby reducing the current erosion, and provide cover and foraging habitat for water voles and other species.

The bank face and toe upstream of the lock (right bank) would benefit from sowing a suitable grass seed mix in combination with the installation of either pre-established coir rolls or coir pallets.

6.0 REFERENCES

CIEEM (2017). *Guidelines for Preliminary Ecological Appraisal, 2nd edition*. Chartered Institute of Ecology and Environmental Management, Winchester.

West Suffolk Council (2024). *West Suffolk Draft Plan (2023 – 2040)*. West Suffolk Council, Bury St Edmunds.

Fishtek Consulting (2023). *River Lark at Turf Lock – Project Proposal*. Fishtek Consulting, Dartington

GB Non-Native Species Secretariat (2022). Available at: [http://www.Non-native species » NNSS \(nonnativespecies.org\)](http://www.Non-native_species » NNSS (nonnativespecies.org)) (accessed 23rd April 2024).

JNCC (2010). *Handbook for Phase 1 Habitat Survey: A technique for environmental audit (revised 2016)*. JNCC, Peterborough.

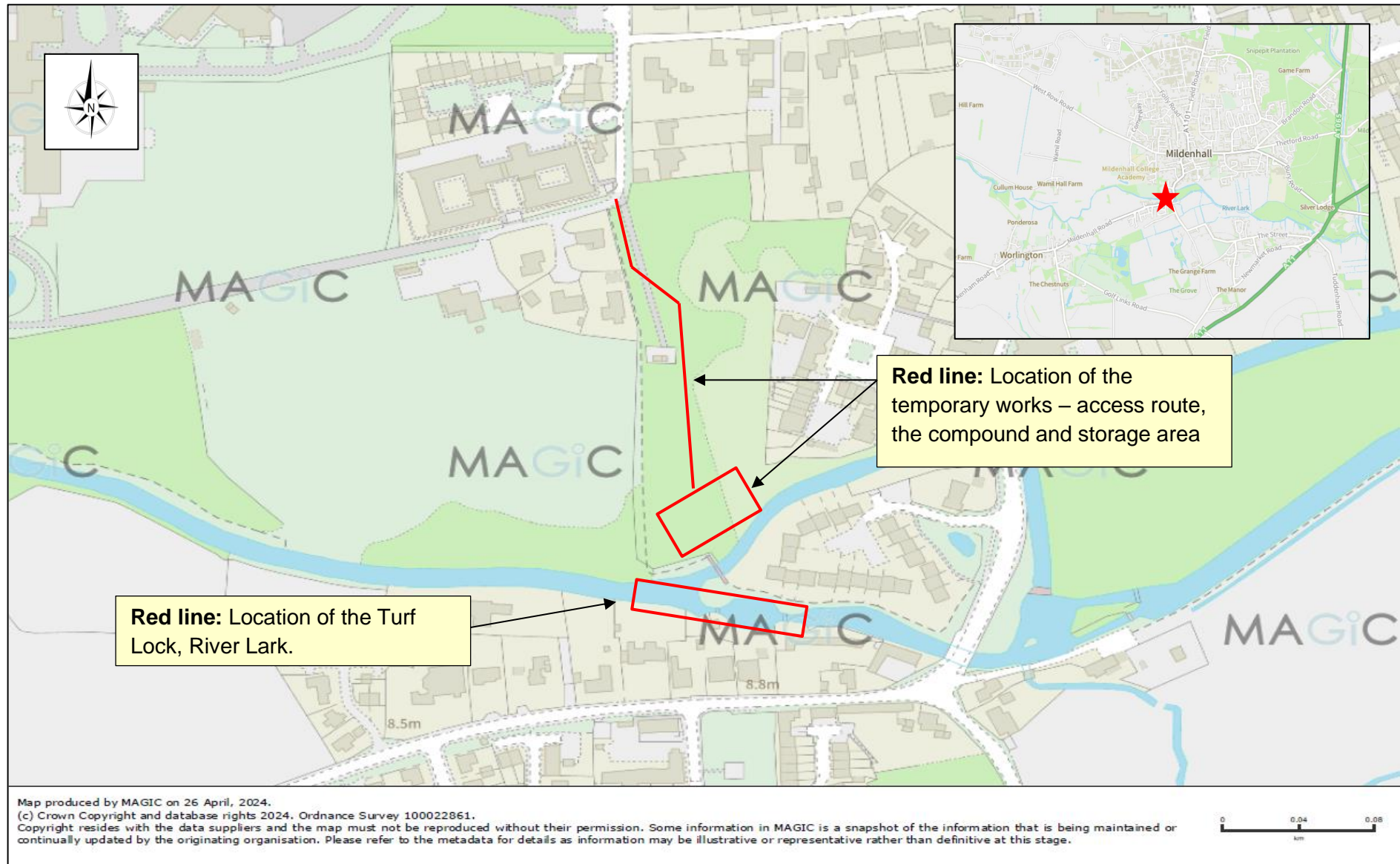
M&H Ecology Ltd (2024). *Letter Report for the Inaugural Site Meeting at Turf Lock, Mildenhall, Suffolk (Including the Recommendations for the Vegetation Clearance for the Purpose of the Proposed Access Route)*. M&H Ecology Ltd, Bedford.

Suffolk Biological Information Service (2024). *Biological Records Request for Turf Lock, Mildenhall, Suffolk*. Suffolk Wildlife Trust, Ipswich.

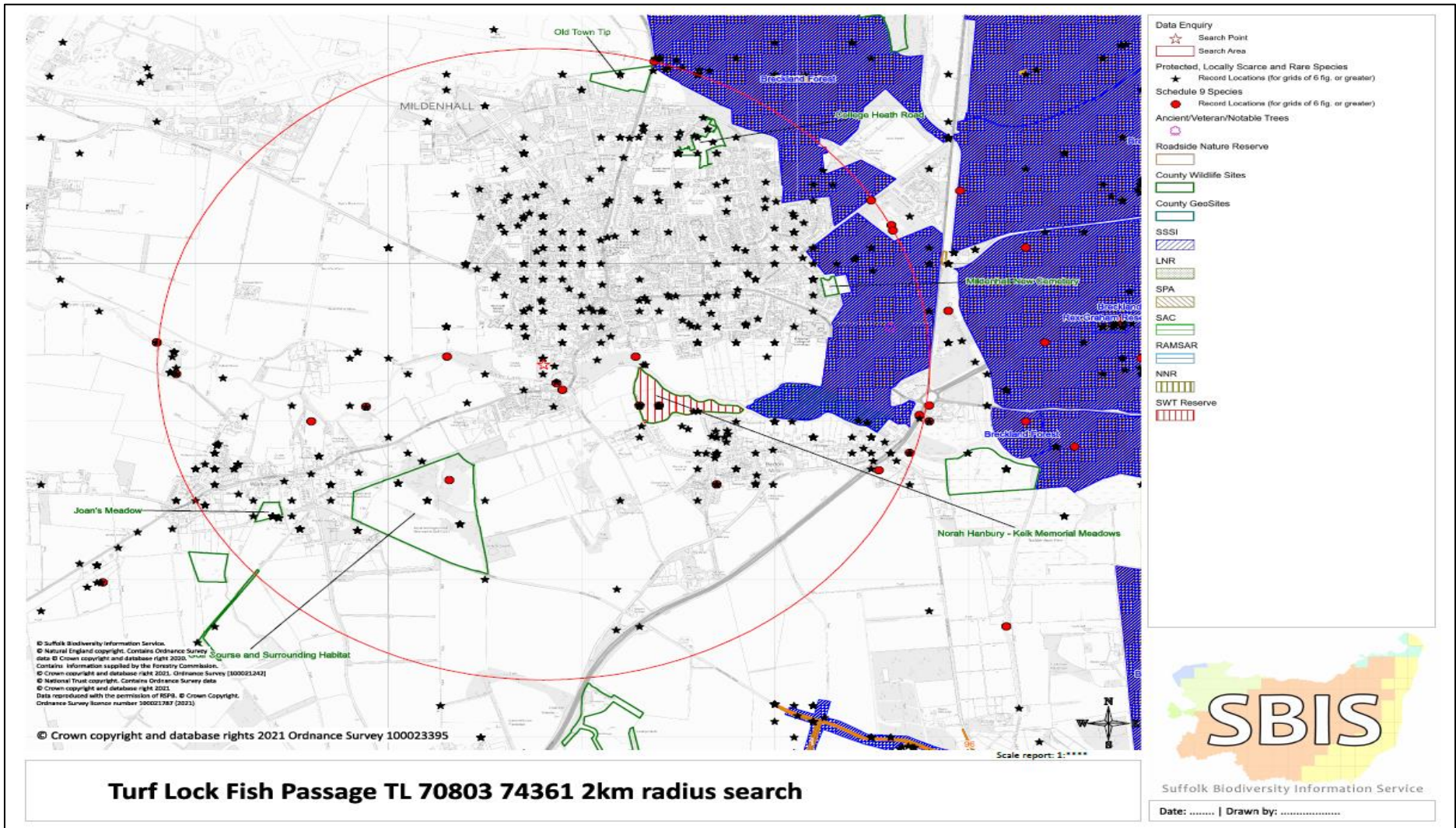
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Appendix A: Location Plan of the Proposed Fish Pass at Turf Lock, Mildenhall, Suffolk



S Appendix B.1: Map of Statutory and Non-Statutory Sites



Appendix B.2: Phase 1 Habitat Survey Map



Appendix C: Photographs



Photograph one: View of the vegetation clearance carried out in March 2024



Photograph two: View of the vegetation clearance carried out in March 2024



Photograph three: View of the woodland in January 2024



Photograph four: View of the buddleia. Refer to Target Note 2 on the Phase 1 Habitat Survey Map in Appendix B.2



Photograph five: View of the grassland in March 2024



Photograph six: View looking towards the Turf Lock (along the right bank)



Photograph seven: View looking upstream towards Turf Lock (from within the river channel in a boat), April 2024



Photograph eight: View looking upstream of the mill leat (April 2024)



Photograph nine: Tawny owl box. Refer to Target Note 1 in the Phase 1 Habitat Survey Map in Appendix B.2, January 2024



Photograph 10: Otter spraint noted upstream of Turf Lock, March 2024



Photograph 11: View of the cut ivy on the white poplar tree, April 2024. Refer to Target Note 3.

APPENDIX D: Planning Policy

PLANNING POLICY

Planning Policy Context:

The National Planning Policy Framework (NPPF) came into effect in March 2012, updated in 2021. It states that the planning system should seek to contribute to and enhance the natural and local environment by minimising impacts on biodiversity and provide net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity.

The NPPF also states that local authorities should seek to promote the preservation, restoration and re-creation of priority habitats and recovery of priority species populations, linked to national and local targets, through planning policies. Priority habitats and species referred to in the NPPF relate to species and habitats of principle importance listed in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

The NPPF states that to protect and enhance biodiversity, (local) plans should:

- Identify and safeguard components of wildlife-rich habitats and wider ecological networks, and
- Promote the conservation and enhancement of priority habitats and ecological networks and the protection and recovery of priority species.

The NPPF states that when determining planning applications, local planning authorities should refuse applications which:

- Cause significant harm to biodiversity which cannot be avoided, adequately mitigated or as a last resort, compensated for
- Plan to develop on land within or outside of a Site of Special Scientific Interest (SSSI) and which is likely to have an adverse effect on it (either individually or in combination with other developments) and/or
- Result in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) unless there are wholly exceptional reasons and where a suitable compensation strategy exists.

The local planning authority should support developments whose primary objective is to conserve or enhance biodiversity, while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.

Local Plan and Policies

The District Plan sets out the Council's planning framework for the district. It identifies how West Suffolk will grow and develop over the plan period of 2023 to 2040. The Plan is currently under consultation (West Suffolk Council (WSC), 2024).

4.2 The Natural Environment

4.2.1. West Suffolk is a rural district with good green infrastructure, locally distinct landscapes and is rich in biodiversity with international, national, and locally important assets located across the district. The purpose of the policies in this section is to seek to deliver the ambition to restore and enhance our natural environment and reverse the decline of biodiversity.

Policy SP4 Green Infrastructure

4.2.2. Good quality green and blue infrastructure in our towns and rural areas can make a positive contribution to improving health and wellbeing, water management, nature recovery and resilience to and mitigation of climate change, along with addressing issues of social inequality and environmental decline.

4.2.3. The policy supports the overarching aim for green infrastructure (GI) in West Suffolk which is to provide:

4.2.4. 'An integrated, multifunctional and resilient network of natural and semi-natural green spaces which support West Suffolk's communities for the benefit of present and future generations.'

4.2.5. The West Suffolk GI Study has identified priority areas for green infrastructure and opportunities for the delivery of green infrastructure within the district. The priority areas have been selected to provide multifunctional benefits to a wide range of people, whilst delivering nature-based solutions to future challenges and conserving the district's most important assets. These are identified as the River Lark corridor, Little Ouse corridor, River Stour corridor, Bury St Edmunds, Newmarket, Clayland Plateau Villages and Breckland Forest and Farmland

Landscape - Policy SP5 Locally valued landscape

4.2.20. West Suffolk is characterised by largely rural landscapes of low-lying landform. Nevertheless, the landscape is diverse, due both to geological influences and the long-term impact of man's response to this through the use of land.

4.2.21. Landscape character is the distinct, recognisable and consistent pattern of elements that makes one landscape different from another. Hedgerows, trees and other natural features are essential components of the landscape, enhancing visual amenity, the quality of the environment and providing habitat for a range of wildlife.

4.2.22. The policies set out the council's aims to protect and enhance the landscapes which contribute to the uniqueness of the wider countryside and also those areas which are valued locally.

Biodiversity and geodiversity

4.2.32. Section 40 of the Natural Environment and Rural Communities Act 2006, which has been strengthened by the Environment Act 2022, places a duty on all public authorities to conserve and enhance biodiversity. A key purpose of this duty is to embed consideration of biodiversity as an integral part of policy and decision making.

4.2.33. Nature conservation sites, both statutory and non-statutory, together with other wildlife-rich habitats and features, provide wildlife corridors and links. These form an essential nature network which is necessary to safeguard and enhance the distribution and diversity of flora and fauna within the district, supporting nature recovery and also wider benefits such as carbon capture, water quality improvements, natural flood risk management and recreation.

4.2.34. The application of the mitigation hierarchy in relation to biodiversity and geodiversity is embedded in the National Planning Policy Framework and in government guidance. The principles of the mitigation hierarchy are avoidance, mitigation and as a last resort compensation.

1. Avoidance – aim to avoid adverse effects through design or the selection of an alternative site.
2. Mitigation through measures to minimise the negative effects of a project.
3. Compensation in exceptional circumstances after all other options to avoid or mitigate harm have been considered.

4.2.35. Development proposals should seek to conserve and enhance the biodiversity and geological interests of the area and in particular ensure that protected species and habitats including those of principal importance in the UK and locally (priority habitats and species) will be protected and, where possible, enhanced.

Policy SP6 Biodiversity net gain

4.2.36. The Environment Act 2021 mandates a minimum 10 per cent BNG to be implemented from January 2024 for all but small sites, which will be required from April 2024. Biodiversity net gain is a legislative requirement, with the detail of how it is implemented set out in regulations. Biodiversity net gain is calculated using the statutory metric and a biodiversity statement, submitted at the planning application stage, sets out how a development will deliver BNG.

4.2.37. The purpose of this policy is to link biodiversity net gain to other strategic objectives and the overall place-making strategy, enabling a holistic approach to ecological enhancement across West Suffolk.

Policy LP15 Protected sites, habitats, and features

4.2.45. Local policy LP15 sets out the councils aims to protect, restore and enhance biodiversity, geodiversity sites, habitats and features.

Policy LP15 Protected sites, habitats, and features

All development must seek to protect sites designated for their biodiversity and geodiversity value, and conserve, restore and enhance important habitats (including priority habitats) and other important biodiversity features on development sites or affected by developments.

Proposals which do not conserve and enhance biodiversity, failing to have appropriate regard to the 'mitigation hierarchy', will be refused.

Proposals for development which could adversely affect the integrity of areas of international or European nature conservation importance, as indicated on the policies map, will be determined in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended) or successor legislation.

Proposed development likely to damage or destroy the interest features of a nationally important site of special scientific interest (SSSI) will not be permitted unless the benefits of the development, at the site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSIs.

Development resulting in the loss or deterioration of irreplaceable habitats such as lowland fens, ancient woodland, ancient and veteran trees will be refused unless it accords with the exceptional reasons identified within the National Planning Policy Framework. If exceptional reasons are justified, a suitable compensation strategy including its delivery will need to be secured as part of any planning permission.

Development proposals which would have a direct or indirect adverse effect on locally designated sites, including county wildlife sites and county geodiversity sites, protected or priority habitats, will not be permitted unless the benefits of the development clearly outweigh the impacts on the features of the site and the wider network of habitats. In addition, proposals must demonstrate that:

- The mitigation hierarchy has been implemented.
- Mitigation and compensation measures are provided which ensure there is a biodiversity net gain in such sites.

Any enhancement measures should align with the relevant nature recovery priorities (if any) set out in the Suffolk Local Nature Recovery Strategy when completed.

Policy LP16 Protected species

4.2.50. Local policy LP16 sets out the council's aims to minimise the impact of development on protected species.

Policy LP16 Protected species

Development which would have an adverse impact on protected or priority species will not be permitted unless there is no alternative, and the local planning authority is satisfied that suitable measures have been taken to:

- a. Reduce disturbance to a minimum.
- b. Maintain the population identified on site, or where this is not possible provide adequate alternative habitats to sustain at least the current levels of population.
- c. Provide enhancement measures to benefit the species.

Any enhancement measures should align with the relevant nature recovery priorities (as appropriate) set out in the Suffolk Local Nature Recovery Strategy when completed.

All planning applications must be supported, where necessary, by appropriate protected species survey and ecological impact assessment, undertaken in accordance with national good practice guidelines.

APPENDIX E: Legislation

Habitats and Species Regulations 2017

The Conservation of Habitats and Species Regulations 2017 came into force on 30th November 2017. The Regulations consolidate and update the Conservation of Habitats and Species Regulations 2010. The Regulations are designed to transpose Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive), into national law. Additionally, they transpose elements of the EU Wild Birds Directive in England and Wales. The Conservation of Habitats and Species Regulations 2017 extend to England and Wales, including the adjacent territorial sea (12 nautical miles from the mean low-water mark of a coastal state).

The draft Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 will ensure that the habitat and species protection and standards derived from EU law will continue to apply after the UK has left the European Union. This draft came into force on exit day (31st January 2020).

Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981 (as amended) is the principle mechanism for the legislative protection of wildlife in England and Wales. This legislation is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') and the European Union Directives on the Conservation of Wild Birds (79/409/EEC) and Natural Habitats and Wild Fauna and Flora (92/43/EEC) are implemented in Great Britain. The provisions relating to animals in the Wildlife and Countryside Act 1981 only apply to 'wild animals'; these are defined as those that are living wild or were living wild before being captured or killed. The Wildlife and Countryside also prohibits the release of non-native species into the wild (Section 14). This is to prevent the release of exotic species that could threaten our native wildlife.

Natural Environment and Rural Communities Act 2006:

The Natural Environment and Rural Communities (NERC) Act 2006 required the Secretary of State to publish lists of habitats and species of principal importance for the conservation of biodiversity in England, under Section 41 of the Act. These lists are used to guide decision-makers (Competent Authorities such as planning authorities) in implementing their duty to have regard to the conservation of biodiversity when carrying out their normal functions (under Section 40 of the NERC Act). Water voles and otters are listed as species of principal importance for the conservation of biodiversity in England under Section 41 of the NERC Act 2006.

Badger Legal Protection

Badgers are afforded protection in England and Wales under the Protection of Badgers Act 1992, it is an offence to:

- Wilfully kill, injure or take a badger (or attempt to do so)
- Cruelly ill-treat a badger
- Dig for a badger
- Intentionally or recklessly damage or destroy a badger sett, or obstruct access to it
- Cause a dog to enter a badger sett
- Disturb a badger when it is occupying a sett.

c. Turf Lock, River Lark.

At a glance...

Obstruction Details	Two redundant lock structures					
EA Area	Anglian		NGR		TL70850 74248	
Obstruct ID	10198		Obstr ⁿ width (m)		5	
River discharge (Q _{ex}) (m ³ s ⁻¹)	Q99	Q95	Q_{mn}	Q20	Q10	%Q_{mn}
		0.53			2.62	100
Operational Range (Q)	Q95-Q10		Location		Full width rock-ramp	
Min Fp flow (m ³ s ⁻¹)	0.53		Max head drop (m)		1.44	
Max HEP flow (m ³ s ⁻¹)	-				-	
Pass type	Full-width rock ramp at 5% slope.		Species Groups		ST, BT, lamprey, grayling, CF, small species and eels	
No. of Flights	1		No. of Units		-	
Flight length(s) (m)	30		Pass width (mm)		4000	
Resting pools	-		Baffle Height (mm)		-	
RA score (dia)	8		RA score (pot)		12	

Site specific details:

- The River Lark is a chalk stream tributary of the River Great Ouse.
- Turf Lock consists of two redundant lock structures downstream of a further structure, Gas Pool Sluice (owned by FCRM), which is likely to have a fish bypass installed in the near future.
- There are considerable constraints at the site, including:
 - Structural instability.
 - Flood risk (there is a care home on nearby land that would be impacted by an increase in flood risk).
 - It is a listed structure.
 - There is a sewage pipe present.
 - The landowner is opposed to any changes to the lock structure and has refused access to the EA.
- Other pass types e.g. Larinier have been considered, but rejected, due to the difficulties of constructing close to the curved lock structures, and flood risk.
- Passage is required for sea trout, brown trout, grayling, coarse fish and eel.
- A previous proposal for this site was discussed in August 2023 but insufficient hydraulic information was provided for approval to be recommended.
- This proposal is for a full width rock ramp at a 5% slope to enable fish passage past both redundant locks.
- The boulders will be embedded by 50% into the concrete and there will be a rip rap infill.

Panel comments and points for area consideration (previous comments in blue):

- It is unclear which source has been used to design the pass, which makes it difficult to ascertain whether or not the hydraulic conditions within the pass

would be suitable. The calculations published by Heimerl *et al* (2008), which build on the design parameters described in the DVWK & FAO 'Fish Passes, Design, Dimensions and Monitoring' guidance, use a more heterogeneous arrangement where pairs of bars of perturbation boulders are used with slightly larger longitudinal gaps between the bar pairs. There is however a greater density of boulders overall than in the proposed Turf lock design. In the proposed design the lateral boulder spacing (a_{y1}) is 4 times the mean boulder size (d_s) using the Heimerl *et al* notation, whereas Heimerl *et al* would recommend the same spacing as $1.65d_s$. The longitudinal gap between rows (a_{x1}) in this design is $4d_s$ whereas Heimerl *et al* would recommend $1.5d_s$. The subsequent row spacing (a_{x2}) is also $4d_s$ where Heimerl *et al* recommend 2.5 to $3.5d_s$. In summary, using the Heimerl *et al* approach would lead to ~120 perturbation boulders for this ramp area, versus the 75 proposed. Given the slope of the ramp, the flow resistance provided by the boulders is important. **Addressed.**

- It is unusual to embed boulders into the 1:1 side slopes and this makes using the DVWK calculations difficult. **Addressed.**
 - Heimerl *et al* also recommend rotating the secondary boulders by 45 degrees to reduce adverse vortices. **Not required.**
 - The ramp has a uniform depth across its width. A frequently used approach to providing a range of hydraulic conditions on a rock ramp is to have a deeper central area and gradual lateral slopes towards each margin. **Addressed.**
 - It would be advisable to check the hydraulic performance of the pass before plant leave the site. It may be that a few strategic minor stone placements could correct for the real stone variations that occur. Water depth requirements would need to be met. **Still applicable.**
 - The boulders embedded into the 1:1 side slopes interrupt the surface wetted line for eel and other small fish. As this is a site fairly low down the catchment with small eel and lamprey as well as small coarse fish it would seem an advantage to have continuous wetted routes for these fish at the margins. **Addressed.**
 - There appears to be more open area in the boulder arrangement below the pass entrance than within the pass, which suggests it would not have a level controlling effect unless the depth was rather less than the pass. **Addressed.**
 - There doesn't seem to be a distinction between the concrete embedded rip-rap on the side slopes and the material between the boulders however, the description of the boulder embedment suggests they are set on a regulating layer of 200mm mass concrete but the rip-rap between them is effectively loose. If that's the case, it not clear if the boulders will remain stable without pinning to the concrete base. **Addressed.**
 - Loose rip-rap provides spaces for small fish to move, so it would be desirable to leave some loose, but sufficiently stabilised to prevent wash-out. **Addressed.**
 - Guidance in the IFM fish pass manual is that "Head difference: normally $\leq 1\text{m}$ but can be used up to 2m with the use of resting pools"; head drop at this site is 1.44m and at maximum 5% gradient, suggesting that some accommodation should be made for weaker swimming species.
-

New comments

- Boulders are now much more densely arranged and appear to be within the range specified in DVWK 2002.
- There is some uncertainty in the DSWLs, which should be considered in the design.

Panel Recommendation: Form and dimensions of the fish pass will be consistent with Approved Status, subject to:

This does not need to return to the Fish Pass Advisory Panel.

Turf Lock Mildenhall

1. Screening Determination

(1) Present status of determination	Initial Determination, additional information is required to make a final determination on this project. The information available indicates that:	Comments: The Turf Lock Briefing document sets out two options for improving fish passage at both Turf Lock and Gas Pool Sluice. Once a preferred option has been selected we will perform a final determination.
(2) Maintenance or improvement / development?	Development/Improvement	Comments: All the options discussed in the Turf Lock Briefing document are considered to be works aimed at bringing about improvement to the assets concerned.
(3) Permitted Development or Planning Permission?	This project is likely to require planning permission	Comments: Although the works at Turf Lock may fall to be permitted development subject to being development within the watercourse, the proposed works at Gas Pool Sluice which involves a new back channel as well as any re-profiling of the River Lark including works to the banks etc., are likely to require planning permission.
(4) Consenting regime (tick all that apply)	<input checked="" type="checkbox"/> The Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999 No. 1783 (As amended) <input type="checkbox"/> The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 No. 571 (as amended) <input type="checkbox"/> Other EIA Regulations. Please detail below: List other Regs: Comments:	

(5) Level of assessment	This project requires a non-statutory Environmental Assessment	Comments: There are only a few environmental sensitivities in this location Therefore, it's considered unlikely that the preferred option, though subject to the extent and scale, would have any significant impacts such that an EIA would be required.
(6) Is an advert required? (Land Drainage Regs only)	Yes an advert is required setting out the EA's intention not to prepare an ES	Comments: The options could constitute land drainage works, in which case, an advert would be required if we consider an EIA is not required.
(7) NEAS ongoing involvement	NEAS will retain this project	Comments: There are likely to be opportunities for (1) environmental enhancement (2) biodiversity net gain (BNG). The NEAS landscape architect could provide advice on (1) and NEAS/ FBG BNG Specialist more generally on BNG.
(8) Does CEEQUAL apply?	Yet to be determined	Comments: If the preferred option costs exceed £2 million then BREEAM (formerly CEEQUAL) will need to be applied.

2. Project Information

Reference/SOP code	ENV0001633C
Location	River Lark, Mildenhall
Grid reference	TL7085574247
Local authority	West Suffolk Council
Objectives	Turf lock is a remnant of when the river Lark was canalised. It is situated within the town of Mildenhall and is a barrier to migratory species trying to access suitable habitat so they can fulfil their life cycle, it is important because it is key to unlocking the River Lark and provides forward momentum for restoration. The river Lark is

	<p>now classed as a flagship Chalk stream. Multiple aims of the work in Mildenhall:</p> <ul style="list-style-type: none"> • to enable the free migration of the native wild Brown Trout and other river species along the course of the river, and allow them to access natural habitat in the river Lark upstream of Mildenhall where habitats are being improved, whilst, • to ensure river management for flood defence is sustainable and affordable going into the future, and • to use the opportunity to enhance the areas around the Lark for recreation and enjoyment by local communities
Description	<p>Within Mildenhall there are two different sites being assessed for fish passage (see Briefing Version 6): Turf Lock (Fig 9) and Gas Pool sluice (Fig 3), both sites are a barrier to natural fish passage and eels upstream to restored areas of habitat suitable for spawning. Turf Lock and Gas Pool sluice are unique and need different options to allow fish passage.</p>
Cost and timescale	To be determined

Advice Note completed by	Andrew Hunter, Senior Environmental Project Manager, NEAS East North Hub (Peterborough)
Date of Determination	3 April 2023
Name of NEAS Qualified CEEQUAL Assessor who has signed of CEEQUAL Scope	N/A (see section 4)
Date CEEQUAL scope signed off	N/A
Stage of project when note completed	Feasibility

3. Justification of determination

a) Key project opportunities

Subject to the nature of the preferred option, there may be opportunities to explore environmental enhancements in relation to landscaping and potential for biodiversity net gain (BNG) at both Turf Lock and Gas Pool Sluice.

The River Lark is a River Lamprey and European Eel migratory route and the proposed works offer up opportunities for modifications to improve passage.

b) Key Environmental Risks

Potential for harm to buried archaeology;

Impact on locally designated heritage asset;

Lowering of current moderate status of water body;

Potential for harm to protected species using local habitats such as water voles, breeding birds, badgers and otters;

Potential for noise / vibration impacts from plant and machinery on residential properties.

c) Anything unusual the project team may not normal encounter

Apart from the locally designated heritage asset and the Conservation Area, very little in the way of sensitive environmental receptors in and around the locality and hence unlikely to encounter anything outside of the normal range.

4. CEEQUAL Scoping

Application of BREEAM (formerly CEEQUAL) cannot be fully determined at this stage pending consideration of options and selection of preferred option.

5. Approval requirements

- WFD compliance assessment may be required for certain works within the watercourse
- EPR flood risk activity permit may be required for certain options
- Consider potential for noise disturbance – may require agreement with council Environmental Health Officer regarding working hours
- Where applicable PROW diversions/closures will require approval from the LPA
- Planning permission may be required for certain options

6. Baseline environmental information

- Designated sites - Works site at nearest point 964m (east side) from Breckland (SPA) and Breckland Forest (SSSI). works site 964m from Barton Mills (LNR)
- Local wildlife sites – works site 425m from Norah Hanbury - Kelk Memorial Meadows CWS.
- Priority Habitat: note specifically the presence of Coastal and floodplain grazing marsh, Deciduous woodland, Lowland dry acid grassland

- Species - Protected species recorded in the area include; Water Vole, Bullhead, Spined Loach

Also consider other species potentially using the local habitat including: water voles, breeding birds, badgers, otters, reptiles and bats (if disturbing/removing mature trees or affecting structures).

- Note that the River Lark is a River Lamprey and European Eel migratory route.
- Invasive non-native species - note specifically the presence in the area of Butterfly-bush, Northern River Crangonyctid, Giant Hogweed, Signal Crayfish, Least Duckweed, Russian-vine, Nuttall's Waterweed, Canadian Waterweed
- Archaeology and cultural heritage - potential to find archaeology if excavating. Consider costings for archaeological watching brief for any site investigations. Listed buildings: nearest LB is 169m from works site. SAMs: works site 228m from Remains of Dovecote and 337m from Market cross.
- Water quality, pollution, and waste arising from works.
- Landscape and visual amenity – works are within or adjacent to the Mildenhall Conservation Area – see map below.
- Trees and vegetation: check for Tree Preservation Orders (TPO) if works require removal of trees.
- Noise and local residents - compliance with best practice
- Check whether any public rights of way and access. If Area registered as common land under CRoW Section 15 Land, therefore accessible to public.
- Eel Regulations (2009) compliance must be confirmed with FBG if works involve an abstraction/ obstruction.
- Main River – River Lark

- Does FBG/the WFD/Catchment Coordinators/others (?) have objectives in the area?

7. Potential environmental impacts (positive and negative) across the lifecycle of the project

- **Are any of the noted environmental sensitivities likely to be impacted?**

It's difficult to state at this stage with certainty as whether or not any of the environmental sensitivities are likely to be impacted by the options. Further consideration should be given once a preferred option is selected. Noise / vibration impacts from plant and machinery have the potential to disturb nearby residential properties, other business/commercial properties and any local school buildings. The options may have potential for pollution to the River Lark and landscape and visual impacts. The Turf Lock is a locally designated heritage asset and it's recommended that discussions are held with the planners/conservation officer at an early date.

- **What sort of actions may be required to manage these?**

Take into account advice from the LPA conservation officer regarding design considerations of the scheme at the Turf Lock site and possible impacts of the

design on the Mildenhall Conservation Area. Consider the appropriate siting of any compound/storage areas prior to the works. Consider access arrangements to the site and the impacts of plant accessing and incorporate suitable mitigation measures to avoid potential damage. Landscape and visual impacts could be addressed by landscaping and tree screening. Environmental Action Plan (EAP) should include details of measures to prevent pollution incidents.

- **Are they likely to be significant?**

Subject to detailed assessment, depending on design considerations, the only potential for a significant impact will be works affecting Turf Lock, but otherwise unlikely to be any significant impacts from any options.

- **Are there associated consents?**

Flood risk activity permit is likely to be required for all the options involving works to the watercourse and banks.

Mitigation to avoid or reduce impacts: Standard mitigation measures included in the EAP should prevent any significant environmental impacts

Opportunities: Partnership working through environmental bodies and landowners for potential biodiversity net gain through habitat improvements and WFD benefits.

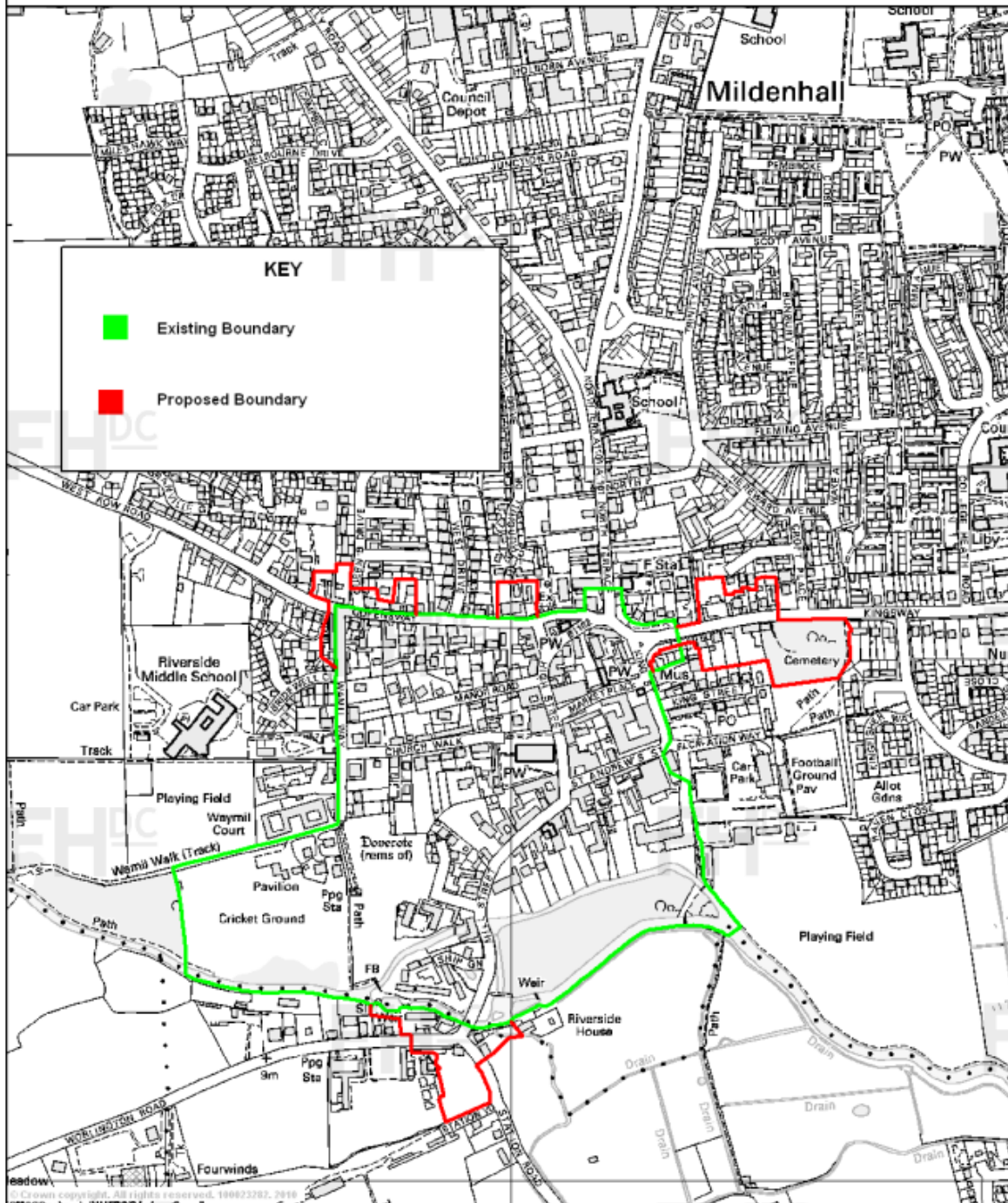
Contributions to net zero carbon: carbon offsetting opportunities through habitat creation (opportunities may be limited).

Consider sustainable materials and resources for construction (i.e. local sourcing; cradle-cradle, low carbon impact etc.)

NEAS consideration of contribution to environmental outcomes

- Consideration of contribution towards WFD measures
- Consideration of contribution towards Biodiversity 2020 outcomes
- Consideration of contribution towards landscape improvements plus provision of Biodiversity Net Gain target
- Consideration of sustainable construction materials and minimising carbon footprint

Appendix A: Mildenhall Conservation Area Proposed Boundary Changes



 <p>Forest Heath District Council</p>	<p>Forest Heath District Council College Heath Road Mildenhall Suffolk IP28 7EY Tel: 01638 719000. www.forest-heath.gov.uk</p> <p>© Crown copyright. All rights reserved. 100023282. 2010.</p>	Scale 1/7500	Date 19/3/2010	
		Centre = 570997 E 274805 N		

Only complete sections 8 and 9 if the project does not require full NEAS ongoing involvement. Where Landscape and/or Heritage specialists retain involvement sections 8 and 9 should be completed:

8. Management of environmental issues during project lifecycle

Note on Table in Section 8 - Complete the table below as required. You should draw on information gathered during the 'determining the need' process.

An Environmental Project Manager from NEAS will have completed Section A of the following table. Section B should be completed by the Project Manager. This table aims to:

- Demonstrate that consideration has been given to the actions proposed by NEAS
- Provide a clear audit trail of how each action has been, or will be, implemented
- Give the NPAS confidence that the advice given by NEAS has been appropriately and proportionately acted upon (or is planned to be acted upon) to meet the expected outcome
- Ensure where external suppliers are required, that appropriate costs have been included within any submission
- Ensure that any mitigation actions are passed on to contractors as appropriate, for application during project implementation

Part A) NEAS to Complete			Part B) Project Manager to Complete		
Objective	Action(s)	Reference	Description of how action has been / or will be implemented	Who will deliver the action (PM or supplier)?	Expected outcome
Confirm presence of protected species	<p>Consultation with FGB is required to determine whether species surveys or licences are required.</p> <p>Develop appropriate mitigation procedures.</p> <p>Follow advice received from FBG.</p>				
Ensure compliance with protected species legislation	<p>Consult with FGB early in the project development</p> <p>Follow advice received from FBG.</p>				
Minimise risk of archaeological finds	<p>Involve NEAS Archaeologist when undertaking site investigations</p>				

Ensure compliance with any WFD compliance assessment	Re-consult NEAS about WFD compliance once preferred option selected.				

9. Requirement for additional support

If additional consultancy support is required, you must scope this tightly and proportionately and if possible include text that should be used for their brief. Note why it cannot be done in-house as this will need to be approved at the Project Appraisal Board (PAB).

River Lark at Turf Lock

Project Proposal



Client: Environment Agency
Date: 21 March 2023
Author(s): Dr Gary Bilotta CEnv MIFM

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Project Title	River Lark at Turf Lock – Project Proposal
Project no.	03259
Date	21 March 2023
Client	Environment Agency

Revision Record

Revision	Date	Authors	Checked by
1.0	21/03/2023	Dr Gary Bilotta	Adam Fryer
1.1	21/03/2023	Dr Gary Bilotta	Adam Fryer

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EXECUTIVE SUMMARY

BACKGROUND: The River Lark upstream of Mildenhall has the potential to support rare and valuable chalk stream species. In fact, there are only ~200 chalk streams like this in the world. The River Lark has been identified as a flagship river for The Chalk Stream Restoration Project which may initiate improvements to habitat and ecological status of the River Lark through restoring sustainable abstraction, reducing point and diffuse sources of pollution, enhancing riverine and riparian habitat, and removing/mitigating barriers to migratory species. The Environment Agency (EA) has previously identified two major barriers along the River Lark that inhibit the free movement of migratory fish species along its course; Turf Lock (NGR: TL 70850 74249) and Gas Pool Sluice (TL 71032 74250).

AIM: This report focusses on investigating the proposed solutions for mitigating the structure at Turf Lock. The report provides a description of the structure at Turf Lock and provides an overview of the two shortlisted options for mitigating the structure: (1) a 58 m long (2.5% slope) rock ramp located within the existing wing walls of Turf Lock, and (2) weir removal at Turf Lock with channel regrading up to the Mill Street Bridge. The report aims to aid local decision making by providing stakeholders with an understanding of the advantages and disadvantages of each mitigation option.

METHOD: A site visit was conducted by Fishtek Consulting on the 15th November 2022. Existing data (previous reports, service searches, ground investigation data, topographic survey data) were reviewed and a desktop study was conducted to identify any environmental and heritage designations. Concept designs were produced for each of the options and these were used by [Breheny Civil Engineering](#) to estimate costs for construction and maintenance, and to estimate carbon footprints (EA carbon footprint tool) associated with construction and maintenance. Finally, the concept drawings were used by [Thomas Mackay Ltd](#) to develop flood risk modelling for the site (existing EA model used as baseline) in order to better understand the flood risk implications of each option.

RESULTS AND CONCLUSION: Both mitigation options improve fish passage for all species. Whilst weir removal is normally the preferred option from a wider habitat perspective (i.e. removing the negative impact of impoundment on upstream habitat), the existing upstream effect on habitat of the impoundment appears to be relatively limited in extent at this site owing to the steepness of the river channel upstream of Turf Lock.

The weir removal and channel regrading option benefits from removing the maintenance requirements for the true right upstream wingwall. It also benefits from reinforcing the true left upstream wingwall, potentially extending its longevity. It is important to note that under a 'do-nothing' scenario, these wingwalls have an estimated overall residual life of 6-10 years and failure of these wingwalls could lead to bank collapse and potential subsidence of properties backing onto the River Lark at this location. It has been estimated that should the entire structure need to be replaced, the rebuild cost on the same site would be in the order of £1.5 million (2019 prices).

The cost of constructing the fish passage mitigation options was estimated to be £472,897.00 plus VAT for the rock ramp option, and £406,385.00 plus VAT for the weir removal and channel regrading option. The carbon footprint of constructing the fish passage mitigation options was estimated to be 183 tonnes of CO_{2eq} for the rock ramp option, and 161 tonnes of CO_{2eq} for the weir removal and channel regrading option. The latter option is also likely to benefit from reduced costs and carbon associated with maintenance (e.g. debris clearance) and eventual wingwall repair. The cost estimates do not include relocation of the sewer that crosses over Turf Lock which could involve significant costs in addition to carbon emissions. This may not be required if a steeper and shorter rock ramp is deemed acceptable to the Environment Agency's National Fish Pass Panel.

Both fish passage mitigation schemes produced reductions in flood levels and extents upstream, though the rock ramp generated more limited impacts on water levels downstream. The downstream increases for the channel regrading were most extensive in the 50% AEP event and produced a similar pattern of impact to the rock ramp for the largest modelled event (0.1% AEP). Both options removed flood risk to properties in Ship Gardens on the right bank. The rock ramp scheme has been identified as the most suitable concept from a flood risk perspective, though if the channel regrading were to be preferred by stakeholders, this might also be suitable following refined design and modelling.

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1. BACKGROUND

The River Lark (Figure 1-1) rises as a chalk stream to the south of Bury St Edmunds and flows for 57 km north west through Mildenhall and the South Level to its confluence with the River Great Ouse. The River Lark's tributaries include the River Linnet, Culford Stream; Cavenham Stream; Tuddenham Stream and the River Kennet. The catchment is mainly rural, with many small villages and the market towns of Bury St Edmunds and Mildenhall. Land use is diverse with tree belts and woodlands.

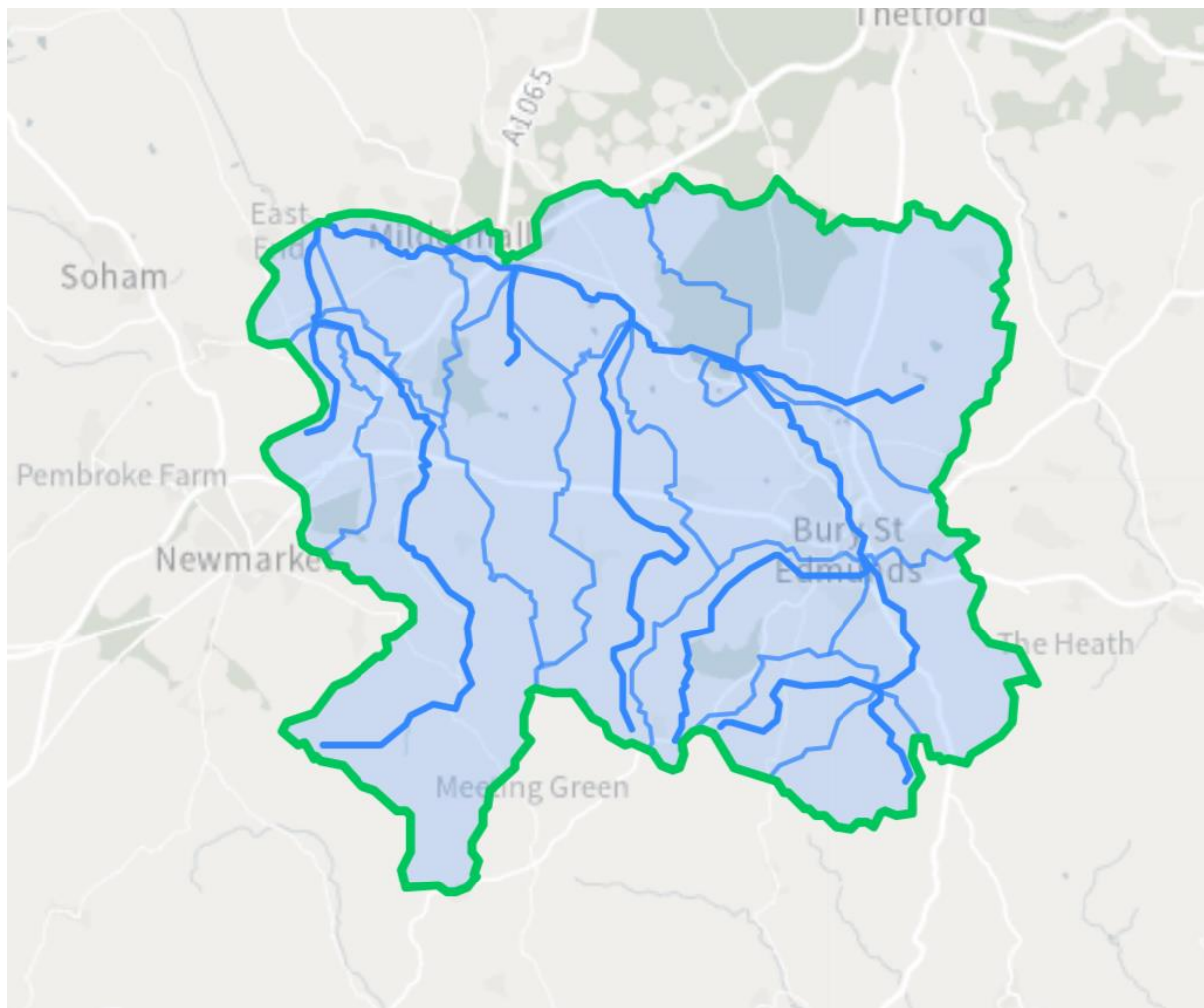


Figure 1-1 Map showing catchment area and tributaries of the River Lark. Source: Environment Agency Catchment Data Explorer; <https://environment.data.gov.uk/catchment-planning/OperationalCatchment/3249>

The River Lark upstream of Mildenhall has the potential to support rare and valuable chalk stream species. In fact, there are only ~200 chalk streams like this in the world. The River Lark has been identified as a flagship river for The Chalk Stream Restoration Project by the [River Lark Catchment Partnership](#). The River Lark Catchment Partnership aims to pool resources, expertise and knowledge to help sustain a vibrant and healthy waterway. The partnership consists of various government, charitable, voluntary, local organisations and individuals each bringing their unique experience and talents to the partnership. The Chalk Stream Restoration Project may initiate improvements to habitat

and ecological status of the River Lark through restoring sustainable abstraction, reducing point and diffuse sources of pollution, enhancing riverine and riparian habitat, and removing/mitigating barriers to migratory species.

The Environment Agency (EA), who are one of the partners involved in the River Lark Catchment Partnership, has previously identified two major barriers (Figure 1-2) along the River Lark that inhibit the free movement of migratory fish species along its course; Turf Lock (NGR: TL 70850 74249) and Gas Pool Sluice (NGR: TL 71032 74250).

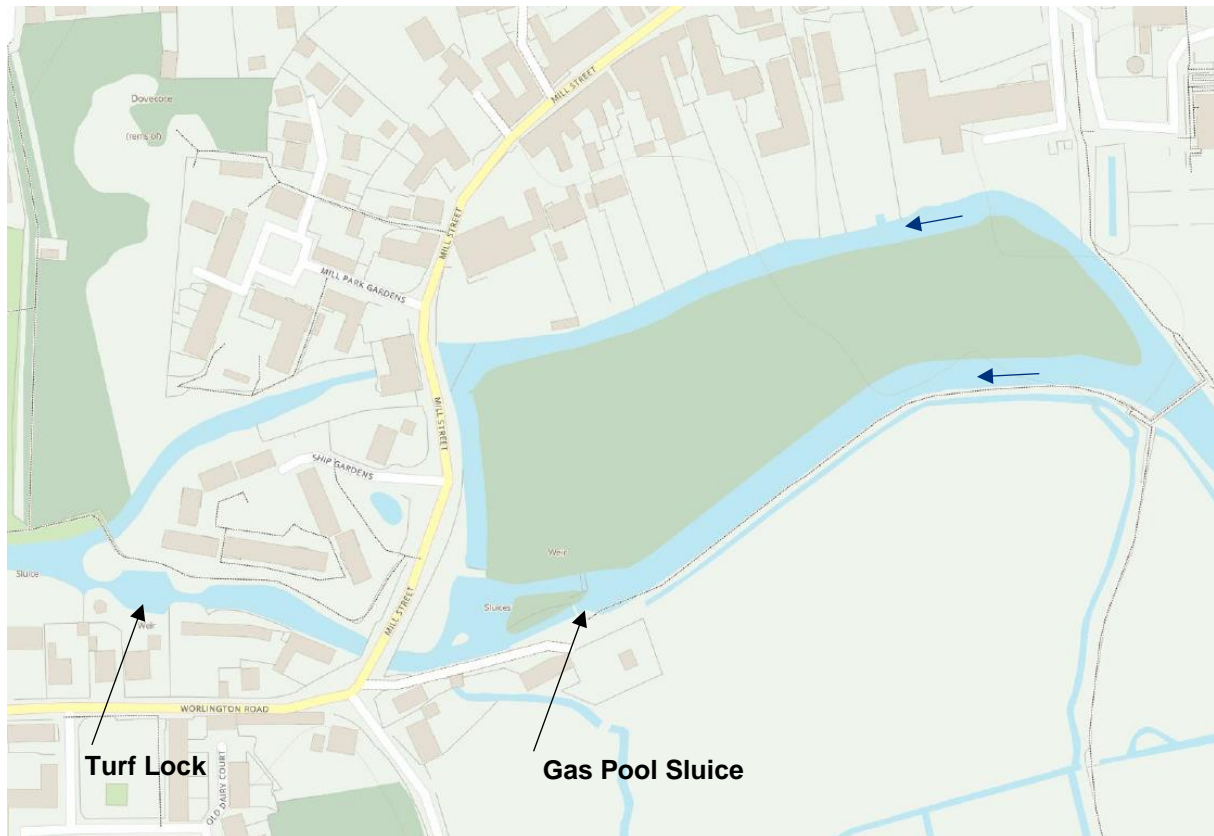


Figure 1-2 Location of Turf Lock and Gas Pool Sluice on the River Lark near Mildenhall, Suffolk. Source: Crown copyright and database rights 2020 Ordnance Survey

This report focusses on investigating the proposed solutions for mitigating the structure at Turf Lock. The report provides a description of the structure at Turf Lock and provides an overview of the two shortlisted options for mitigating the structure. The report aims to aid local decision making by providing stakeholders with an understanding of the advantages and disadvantages of each mitigation option.

2. METHODS

A site visit was conducted by Fishtek Consulting on the 15th November 2022. Photographs were collected of Turf Lock (Figure 2-1) and the surrounding area including the habitat upstream to Mill Street Bridge (Figure 2-2). The river is fairly constrained around the location of Turf Lock. A public footpath runs along the true right bank top of the River Lark upstream of Turf Lock. Residential properties and gardens border both bank tops of the River Lark upstream of Turf Lock, and residential properties border downstream on the true left side. A sewer pipe crosses the River Lark at the upstream masonry wingwalls of Turf Lock. Owing to the steepness of the upstream channel, the zone of impoundment extends only a few metres upstream of Turf Lock with the channel between Turf Lock and Mill Street Bridge being relatively shallow (0.15 m) and moderately fast flowing. The flow on the day of survey estimated to be $\sim Q_{80}$ based on the upstream flow gauge ([River Lark at Temple](#)). The combined structural head of Turf lock was estimated to be ~ 1.46 m from the upstream crest to the river bed level downstream of Turf Lock.



Figure 2-1 Photograph of upstream end of Turf Lock captured from the downstream true right bank on 15/11/2022.



Figure 2-2 Photograph of the River Lark downstream of Mill Street Bridge, captured from the bridge itself on 15/11/2022 looking in a downstream direction towards Turf Lock

Existing data (previous reports, service searches, ground investigation data, topographic survey data) were reviewed and a desktop study was conducted to identify any environmental and heritage designations.

- The services search (provided by the EA) confirmed that the sewer pipe that crosses the River Lark at the upstream end of Turf Lock is still active (Figure 2-3).
- The environmental designation search (Figure 2-4) confirmed that the site benefits from the statutory designations of a SSSI Impact Risk Zone associated with sites to the east (e.g. Breckland Forest SSSI; Breckland SAC, and others) and a Nitrate Vulnerable Zone (2017 designations).
- The heritage search confirmed that there are no listed buildings or structures within a 100 m radius of Turf Lock (Figure 2-5).

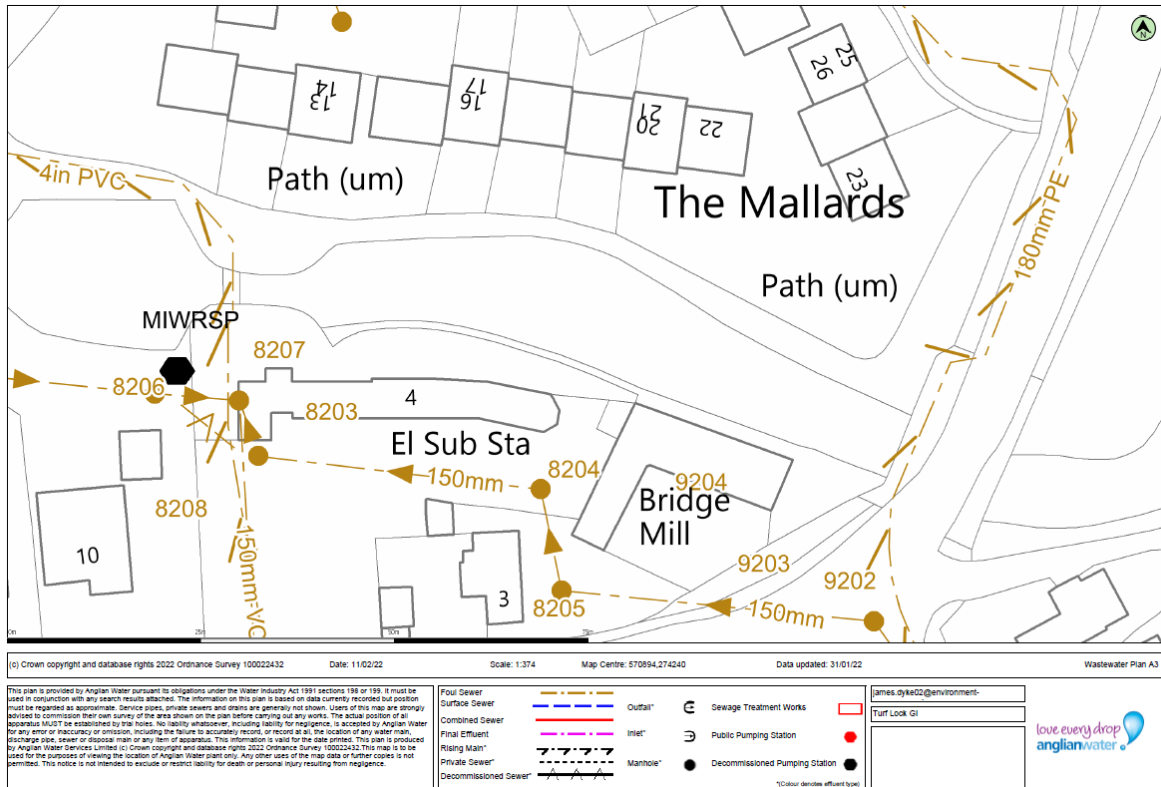


Figure 2-3 Anglian Water wastewater assets in vicinity of Turf Lock

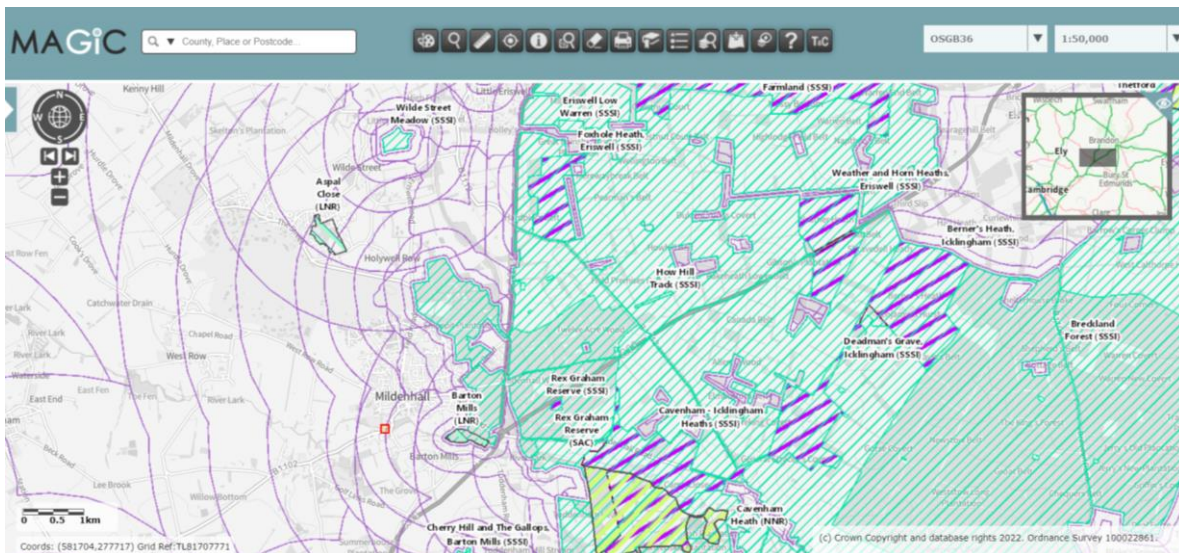


Figure 2-4 Statutory environmental designations in the vicinity of Turf Lock (red square). Purple lines represent SSSI Impact Risk Zones. Source: <https://magic.defra.gov.uk/magicmap.aspx>

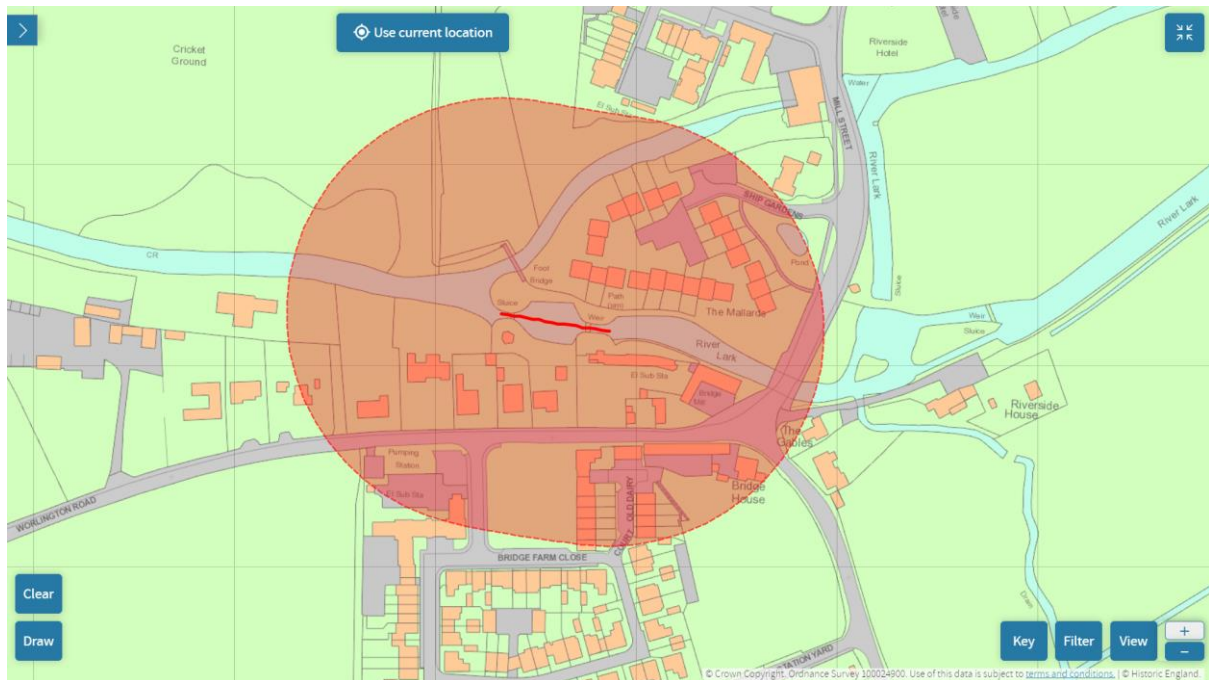


Figure 2-5 Heritage search within a 100 m radius of Turf Lock. Source: <https://historicengland.org.uk/>

An asset condition inspection report (conducted by [VBA](#) in 2019 and provided to Fishtek by the EA) provides a schematic representation of the Turf Lock structure (Figure 2-6) with the condition summary for each element of the structure provided in Figure 2-7. It is noted that the wingwalls of the upper and lower weirs were in a poor overall condition with an estimated overall residual life of 6-10 years. Failure of these wingwalls could lead to bank collapse and potential subsidence of properties backing onto the River Lark at this location. VBA (2019) estimated that should it be decided to replace the entire structure, the rebuild cost on the same site would be in the order of **£1.5 million** (2019 prices).

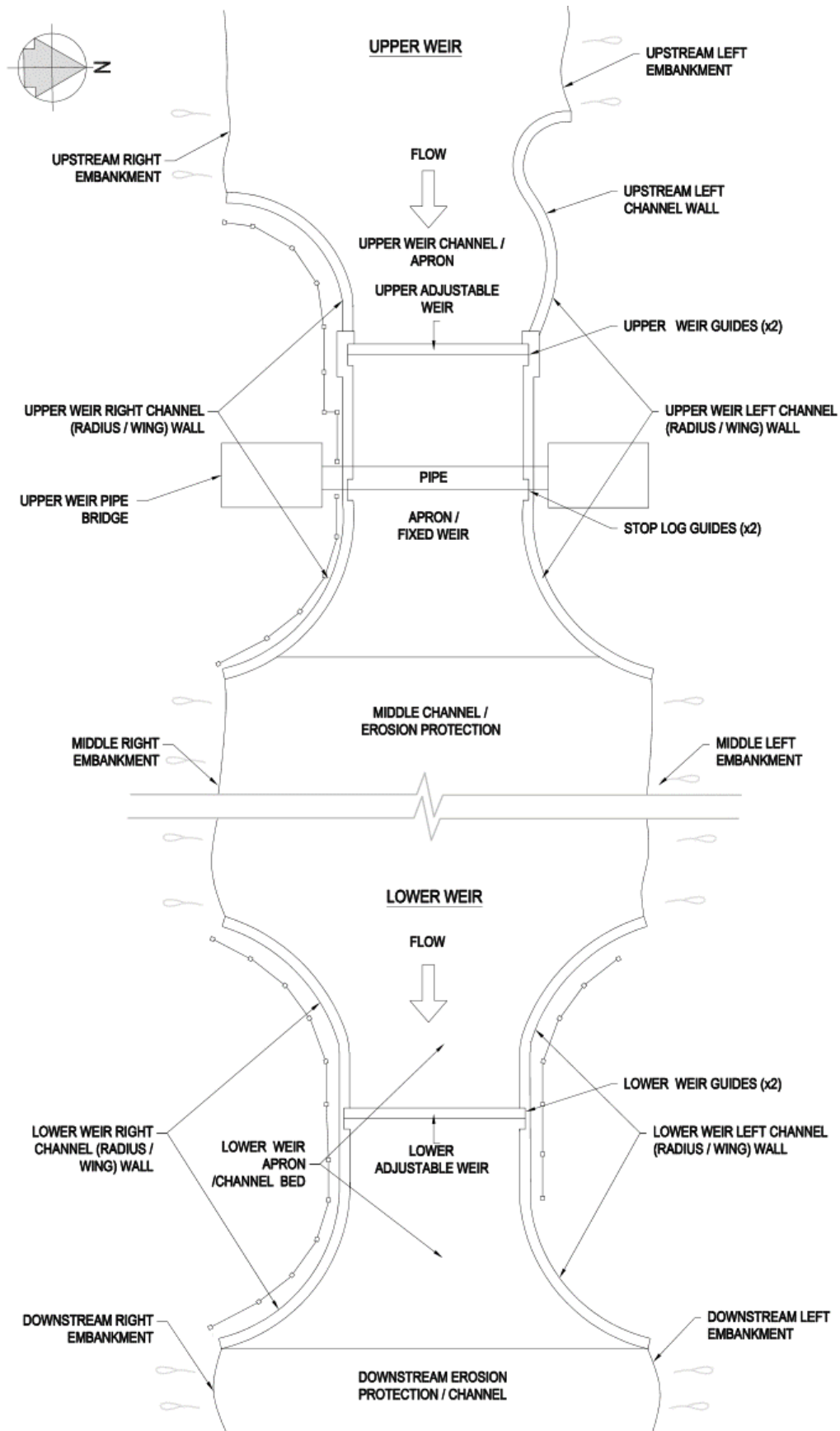


Figure 2-6 Schematic representation of Turf Lock. Source: VBA asset condition inspection report (2019)

Structure	Principal Component	Condition Summary	Estimated Residual Life (Years)
Upper Weir	Upstream Embankments	Fair – Minor erosion	10-15
	Upper Weir Channel / Apron	Unknown	-
	Upper Weir Channel Walls	Poor – Spalling, missing brickwork and mortar	6-10
	Upper Weir Pipe Bridge	Fair – Missing brickwork	10-15
	Upper Adjustable Weir	Fair – Deterioration of timber stop log	6-10
	Upper Fixed Weir	Unknown	-
Embankments and Channel	Middle Channel / Erosion Protection	Poor – Scour adjacent to upper weir	6-10
	Middle Embankments	Unknown	-
Lower Weir	Lower Weir Channel Walls	Poor - Spalling, missing brickwork, mortar and structural movement	6-10
	Lower Weir Apron / Channel Bed	Fair – Exposed rebar	10+
	Lower Adjustable Weir	Fair – Ageing timber stop log	10+
	Downstream Erosion Protection / Channel	Good	15-20
	Downstream Embankments	Fair - Minor erosion, tree adjacent to right wall	6-10
General	Road, Paths and Access	Fair – Lack of vehicle access	-
	Site Fencing and Signage	Fair – Damaged mesh, ageing timber	15+
	Vandalism Issues / Resistance	Fair – Public access, minimal security	-
	Public and Operator Safety	Fair – Lack of formalised access	-

Figure 2-7 Condition summary for various elements of Turf Lock. Source: VBA asset condition inspection report (2019)

Following on from previous studies at the site (Atkins, 2018), the EA concluded that the two options that should be taken forward to concept design for stakeholder consultation were: (1) a 58 m long (2.5% slope) rock ramp located within the existing wing walls of Turf Lock, and (2) weir removal at Turf Lock with channel regrading up to the Mill Street Bridge. Concept designs were produced for each of the options (see Section 3) and these were used by [Breheny Civil Engineering](#) to estimate costs for construction and maintenance (see Section 4), and to estimate carbon footprints (EA carbon footprint tool) associated with construction and maintenance (See section 5). Finally, the concept drawings were used by [Thomas Mackay Ltd](#) to develop flood risk modelling for the site (existing EA model used as baseline) in order to better understand the flood risk implications of each option (see Section 6).

3. CONCEPT DESIGNS

Option 1 is a ~58 m long, 2.5% slope rock ramp which is designed to fit within the existing wing walls of Turf Lock. The existing upstream apron/fixed weir would be removed and replaced with the substrate that forms the rock ramp. The wingwalls would require some repair at the time of rock ramp construction. The rock ramp would have a base width of 2.58 m with 1-in-2 side slopes until these reach the existing vertical lock walls. The upstream invert of the rock ramp would be 3.90 m AOD and the downstream invert would be 2.44 m AOD. There would be 58 rows of perturbation boulders, with 2 to 3 perturbation boulders per row, each perturbation boulder with an approximate diameter of 0.5 m and an approximate height above the rock ramp invert of 0.7 m. The rock ramp would need to be constructed from concrete with boulders embedded into this or formed in-situ. Additional roughness would be added by some embedded cobbles in the concrete surface. This design requires rip-rap and earth infill of the large pool between the upper and lower weirs of Turf Lock. Access for construction is assumed to be via the downstream true right bank and will require construction of a temporary access ramp. The rock ramp would achieve approximate depths (from base invert) of 0.23 m at Q_{95} and ~0.88 m at Q_{10} . Average velocities would be approximately 0.66 m/s at Q_{95} and ~0.84 m/s at Q_{10} ¹.

¹ The concept designs are subject to modification at outline design and detailed design phases. All dimensions and hydraulic calculations will be confirmed as part of any planning application documents and environmental permits. Flows are scaled from the upstream gauge at Temple. The catchment area at Temple gauge is 272 km². Q_{95} at Temple = 0.457 m³/s. Q_{10} at Temple = 2.26 m³/s. The catchment area upstream of Turf Lock is 315.17 km². If the gauged flows at Temple are scaled to the catchment size upstream of Turf Lock, then Q_{95} at Turf Lock = 0.529 m³/s and Q_{10} at Turf Lock = 2.62 m³/s. However, there are abstractions between Turf Lock and the gauge at Temple.

- Licence 6/33/37/*S/0363/R01 can abstract from TL 74166 73646 and operate from 1st November to 31st March inclusive and abstract up to 107 m³/hr or 0.0297 m³/s. This licence is unlikely to affect Q_{95} flows because of the time of year that it can operate over.
- Licence 6/33/37/*S/0420/R01 can abstract from TL 7352 7099, TL 7320 7272 and TL 7394 7369 and can operate from April to October inclusive abstracting up to 0.0202 m³/s. This licence is very likely to affect (reduce) Q_{95} flows because of the time of year that it can operate over.
- Licence AN/033/0037/029 can abstract from TL 71836 74080 and can abstract from a 100 mm gravity fed pipe all year round. The abstraction rate is unspecified in the licence. A gravity fed pipe will vary in its discharge based on material, length and slope. If we assume it is a plastic pipe with 1 m length and 0.1 slope then abstraction rate would be 0.029 m³/s.

If both of the summer operating abstractions are deducted from the scaled Q_{95} value we end up with a **Q_{95} value of 0.478 m³/s**. This is very similar to the gauge value upstream at Temple. Even more so if we remove some further water due to leakage (~5L/s at Parkers Mill). If we deduct the winter abstraction of 0.0297 m³/s from the scaled Q_{10} value we end up with a **Q_{10} value of 2.59 m³/s**.

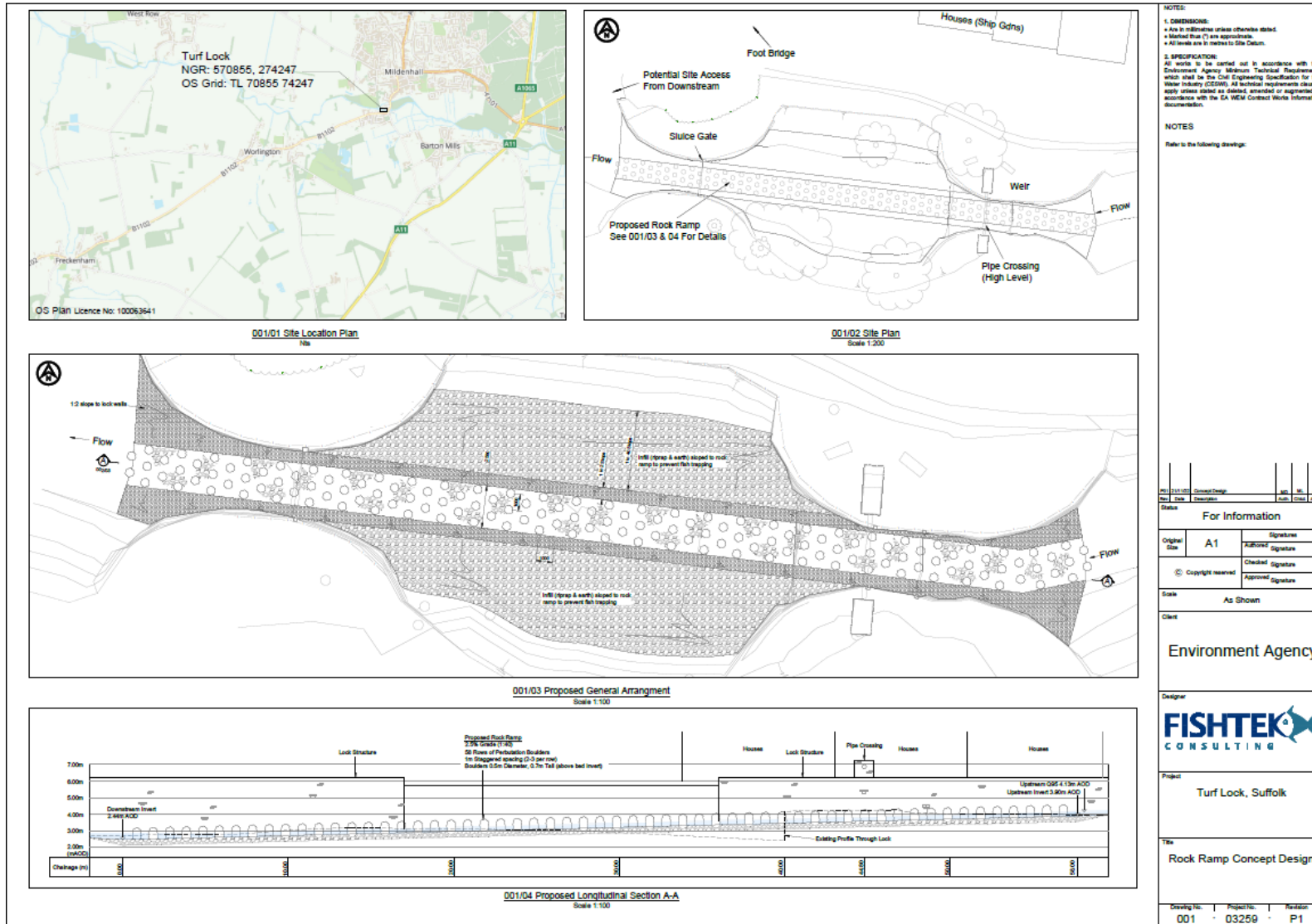


Figure 3-1 Option 1: A 58 m long, 2.5% slope, rock ramp within Turf Lock

Option 2 involves removal of the upper weir and removal of the true right wingwall at the upper weir combined with regrading of the river channel over 177 m, from downstream of Mill Street Bridge to downstream of the lower weir of Turf Lock, to achieve an average 1.23% slope. Informal crescentic rock bed checks at 30-40 m spacing between centres would be used to fix the newly regraded slope and to modify the channel hydraulics. Each rock bed check should have a varied crest height across its width being between 0.1 m and 0.2 m above the general river bed invert at that location. The rock bed checks would be 0.3 to 0.5 m thick, with recommended two thirds height (i.e. up to 0.6 m) embedded in river bed material or bedrock. These will create backwater pools of up to 16 m in length and will create pockets of boundary layers with lower velocities for weaker swimming fish to exploit. The upper wingwall on the true right bank would be demolished and the bank line would be moved northwards to achieve a wider (5 m minimum) channel. The new true right bank and the existing wing walls on the true left bank at this location would be reinforced and retained through use of piling (rotary core piles). Rotary core piles or secant piles do not produce as much vibration during construction as standard percussive piles. This is a key design factor for this site which is in close proximity to existing properties. The coping stones that are currently on the top of the true right wingwall will be embedded into the newly regraded river bed so that the footprint of the former structure can be seen from the footpath. This combined with an information board adjacent to the footpath show the historic importance and footprint of the former structure. The true left wingwall will also remain in place, with piling only covering the lower half of that wingwall. Some repairs to the existing wingwall could be conducted at the time of construction. This design requires the sewage pipe (Anglian Water) to be relocated. The EA are currently in discussion with Anglian Water about relocating this asset.

Water depths in the channel will vary from 0.14 m (free flowing channel) to 0.2 m (backwater) at Q_{95} up to >0.39 m at Q_{10} . Average velocities will vary from up to 0.8 m/s (free flowing channel) at Q_{95} (although many pockets of lower velocity will exist) to up to 1.5 m/s (free flowing channel) at Q_{10} (although pockets of lower velocity will exist). The advantage of the weir removal and channel regrading option is that in addition to improving fish passage, it also removed the negative impact of impoundment on upstream habitat, although this is relatively limited in extent at this site owing to the existing channel steepness.

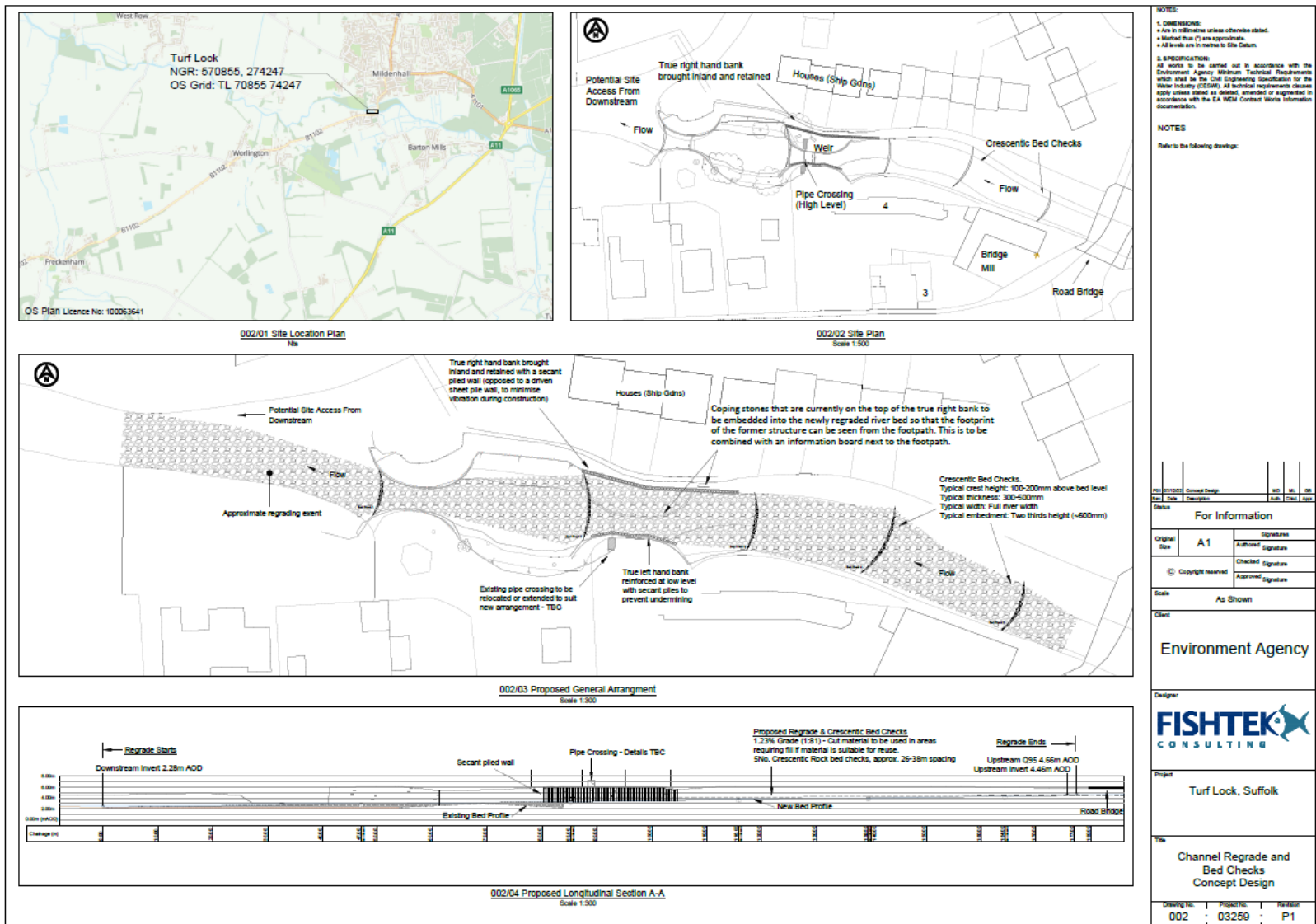


Figure 3-2 Option 2: Weir removal and river regrading with wingwall removal of the true right upper wingwall

4. BUDGETARY COSTINGS

The concept designs and associated information were used by [Breheny Civil Engineering](#) to estimate costs for construction and maintenance. The detailed breakdown of costs is provided separately to this report (Brehency, 2023a; 2023b).

The cost of constructing the fish passage mitigation options was estimated to be £472,897.00 plus VAT for the rock ramp option, and £406,385.00 plus VAT for the weir removal and channel regrading option. The latter option is also likely to benefit from reduced costs associated with maintenance (e.g. debris clearance between perturbation boulders) and eventual wingwall repair. The cost estimates do not include relocation of the sewer that crosses over Turf Lock. The cost of relocating the sewer could potentially be avoided for the rock ramp option if a steeper and shorter design was permitted by the Environment Agency's National Fish Pass Panel. This would also reduce the overall construction cost for this option.

The weir removal and channel regrading option benefits from removing the maintenance requirements for the true right upstream wingwall. It also benefits from reinforcing the true left upstream wingwall, potentially extending its longevity. It is important to note that under a 'do-nothing' scenario, these wingwalls have an estimated overall residual life of 6-10 years and failure of these wingwalls could lead to bank collapse and potential subsidence of properties backing onto the River Lark at this location. It has been estimated that should the entire structure need to be replaced, the rebuild cost on the same site would be in the order of £1.5 million (2019 prices).

5. CARBON FOOTPRINT

The concept designs were used by [Breheny Civil Engineering](#) to estimate carbon footprints associated with construction. The Environment Agency's carbon footprint tool was used to perform the calculations. The detailed breakdown of carbon emissions is provided separately to this report (Brehency, 2023a; 2023b).

The carbon footprint of constructing the fish passage mitigation options was estimated to be **183 tonnes of CO_{2eq}** for the rock ramp option, and **161 tonnes of CO_{2eq}** for the weir removal and channel regrading option. The latter option is also likely to benefit from reduced carbon emissions associated with maintenance (e.g. debris clearance) and eventual wingwall repair. That said, a shorter and steeper rock ramp, if permitted by the Environment Agency's National Fish Pass Panel, could have a lower carbon footprint than currently calculated for the concept design stage and could negate the need to relocate the sewer.

6. FLOOD RISK ASSESSMENT

The concept drawings were used by [Thomas Mackay Ltd](#) to develop flood risk modelling for the site (existing EA model used as baseline) in order to better understand the flood risk implications of each option. The detailed report is available separately (Thomas Mackay Ltd, 2023), but is summarised below.

Both fish passage mitigation schemes produced reductions in flood levels and extents upstream, though the rock ramp generated more limited impacts on water levels downstream. The downstream increases for the channel regrading were most extensive in the 50% Annual Exceedance Probability (AEP) event (e.g. 1-in-2 year event) and produced a similar pattern of impact to the rock ramp for the largest modelled event (0.1% AEP, i.e. 1-in-1000 year event). Both options removed flood risk to properties in Ship Gardens on the right bank.

The rock ramp scheme has been identified as the most suitable concept from a flood risk perspective, although if the channel regrading were to be preferred by stakeholders, this might also be suitable following refined design and modelling.

7. CONCLUSIONS

The option with the greatest environmental benefit (improves fish passage AND removes the negative effect of impoundment on upstream habitat) and the lowest construction cost and lowest carbon footprint is the weir removal and channel regrading option. However, it is important to note that the construction cost and carbon footprint of the rock ramp option could potentially be significantly reduced from the figures quoted in this report if a steeper and shorter rock ramp is deemed acceptable to the Environment Agency's National Fish Pass Panel. This would also negate the need to relocate the sewer crossing at Turf Lock, an element that is currently not included in the cost estimates for either option.

The weir removal and channel regrading option also benefits from removing the maintenance requirements for the true right upstream wingwall. It also benefits from reinforcing the true left upstream wingwall, potentially extending its longevity. It is important to note that under a 'do-nothing' scenario, these wingwalls have an estimated overall residual life of 6-10 years and failure of these wingwalls could lead to bank collapse and potential subsidence of properties backing onto the River Lark at this location. It has been estimated that should the entire structure need to be replaced, the rebuild cost on the same site would be in the order of £1.5 million (2019 prices).

While the weir removal and channel regrading option had less of a flood risk benefit compared to the rock ramp option, this benefit could be enhanced through refined design and further modelling at the outline design stage.

8. REFERENCES

Breheny (2023a) Carbon footprint calculations and costing for the rock ramp concept design at Turf Lock using the EA Carbon Calculator.

Breheny (2023b) Carbon footprint calculations and costing for the weir removal and channel regrading concept design at Turf Lock using the EA Carbon Calculator.

Thomas Mackay Ltd (2023) Turf Lock Restoration: Flood Risk Modelling and Assessment. Version 0-1 January 2023.

VBA (2019) East Anglia Area (Great Ouse Catchment) Detailed Asset Inspections: Asset Condition Inspection Report.

Water Resources Screening Tool Output

Water Resources Act 1991 (as amended) and Environment Act 1995

Screening parameters and abstraction details

Point/reach/area	National Grid Reference	Daily quantity (m ³)	Screening type	Screening length/radius	Source of supply (Detailed River Network name)	Integrated waterbody name and ID	WFD waterbody name and ID
1	tl7084174251	25	SW point and d/s search	5.91km	River Lark	Lark downstream of Mill Street Bridge, GB105033043052	Lark downstream of Mill Street Bridge, GB105033043052

General information

Feature	Name	Related abstraction point(s)
Water Management Area	Cambridgeshire and Bedfordshire (OID:1615)	'1' is within feature
Level Dependent Management Units	None	

Statutory bodies

Feature	Name	Related abstraction point(s)
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Internal Drainage Board	None	
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Statutory Water Undertaker (SWU)	Anglian Water (OID:6)	'1' is within feature
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Technical assessment information

General information

Feature	Name	Related abstraction point(s)
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Abstraction Licensing Strategy (ALS)	Cam and Ely Ouse (including South Level) (OID:4161)	'1' is within feature
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Water Framework Directive

Groundwater classifications

Waterbody Name	Not Tested
WFD Element Name	Classification
Quantitative Status	Not Tested
Groundwater Dependent Surface Waterbody Status	Not Tested
Groundwater Dependent Terrestrial Ecosystem Status (GWTE)	Not Tested
Saline Intrusion Status	Not Tested

Water Balance status	Not Tested
Chemical Status	Not Tested

Surface water classifications

Waterbody Name	Lark downstream of Mill Street Bridge GB105033043052
WFD Element Name	Classification
Hydrological Regime (River flow compliance)	Supports Good
A/HMWB designation	Heavily Modified
Ecological Potential	Moderate
Ecological Status	Moderate
Physico-Chemical Status	Moderate

Hydrological information (surface water)

General information

Feature	Status	Related abstraction point(s)
Hydrometric catchment	Lark C033037 (OID:778)	'1' is within feature

Hydrological Assessment Point (AP)	None	
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Water availability colours key		
Number	Colour	Definition
1	Grey	FL flows > natural flows (over 10% above)
2	Green	FL flows > EFI
3	Yellow	FL flows < EFI (within 10% below)
4	Orange	FL flows < EFI (over 10% below)
5	Red	RA flows < EFI
6	Purple	RA flows < EFI (over 25% below)

Water resources availability

Waterbody Name and ID	High flow (Q30)		Mid flow (Q50)		Low flow (Q70)		Very low flow (Q95)		
	Flow (Ml/d)	Availability colour	Flow (Ml/d)	Availability colour	Flow (Ml/d)	Availability colour	Flow (Ml/d)	Availability Colour	RA flow compliance
Lark downstream of Mill Street Bridge (GB105033043052)	-2.30	3	-2.12	4	-1.96	4	-1.62	4	
Lower River Lark and Chalk unit (AP10, Lower River Lark and Chalk unit)	4.89	3	2.93	4	3.77	4	1.84	4	
Denver Sluice (AP17, Denver Sluice)	-50.27	2	-86.06	4	-106.94	4	-132.44	5	BAND1
Ely Ouse (South Level) (GB205033000070)	0.00	2	0.00	4	0.00	4	0.00	5	BAND1
Relief Channel (GB205033047665)	-16.67	2	-18.41	4	-19.26	4	-19.98	5	BAND1
GREAT OUSE (GB530503300300)	673.27	2	687.12	2	300.34	3	-61.48	4	

WASH INNER (GB530503311300)	0.00	0	0.00	0	0.00	0	0.00	0	
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Critical waterbody – this is highlighted in **bold** in the table above.

Water resources availability downstream

Waterbody Name	Lark downstream of Mill Street Bridge, GB105033043052
Q Percentile	Resource Availability
Q30	3
Q50	4
Q70	4
Q95	5

Waterbodies from surface water point/reach/area downstream (% of Qn95 flow)		
Waterbody Name and ID	Qn95 flow from WB into next downstream WB (MI/d)	Abstraction quantity as % of Qn95 flow from WB into next downstream WB
Lark downstream of Mill Street Bridge (GB105033043052)	39.80	0.06% i.e. $((25/1000)/39.80) \times 100$
Lower River Lark and Chalk unit (AP10, Lower River Lark and Chalk unit)	44.25	0.06% i.e. $((25/1000)/44.25) \times 100$

Denver Sluice (AP17, Denver Sluice)	366.59	0.01% i.e.((25/1000)/366.59) x 100
Ely Ouse (South Level) (GB205033000070)	366.59	0.01% i.e.((25/1000)/366.59) x 100
Relief Channel (GB205033047665)	375.10	0.01% i.e.((25/1000)/375.10) x 100
GREAT OUSE (GB530503300300)	548.71	0.00% i.e.((25/1000)/548.71) x 100
WASH INNER (GB530503311300)	1168.76	0.00% i.e.((25/1000)/1168.76) x 100

Hydrogeological information (groundwater)

Feature	Name	Related abstraction point(s)
Saline & Intrusions Risk Areas	Not Tested	

Protected rights, lawful users and applications information

Groundwater search

Feature	Licence number or reference number	Licence holder or applicant name	Distance and direction
NALD Abstraction licence points	Not Tested		
NALD Abstraction licence reaches	Not Tested		

NALD Abstraction licence areas	Not Tested		
NALD Impoundment licences	Not Tested		
Deregulated NALD abstraction point	Not Tested		
Deregulated NALD abstraction reach	Not Tested		
Deregulated NALD abstraction area	Not Tested		
Current Applications in Hand	Not Tested		
NA Current Applications in Hand	Not Tested		
Refused Applications	Not Tested		

Surface water or LDE search (including searches associated with groundwater)

Feature	Licence number or reference number	Licence holder or applicant name	Distance and direction
NALD Abstraction licence points	AN/033/0037/033	Mildenhall Internal Drainage Board (OID:12206139)	4.10km d/s from '1'
NALD Abstraction licence reaches	6/33/39/*S/0478/R01	Jonathan Robert Waters (OID:6260426, 6260427, 6260428, 6260439, 6260451, 6260474, 6260482)	0.57km d/s from '1'

	6/33/38/*S/0057/R01	G A Thornalley & Sons (OID:6263516, 6263519, 6263524)	1.78km d/s from '1'
	6/33/37/*S/0423/R01	H SUMMERS & SON (OID:6257322, 6257323)	1.96km d/s from '1'
	6/33/34/*S/0293/R01	CLARKE FARMS (ISLEHAM) LIMITED (OID:6263792, 6263797)	4.45km d/s from '1'
NALD Abstraction licence areas	None		
NALD Impoundment licences	None		
Deregulated NALD abstraction point	None		
Deregulated NALD abstraction reach	None		
Deregulated NALD abstraction area	None		
Current Applications in Hand	AN/033/0037/040	Environment Agency (OID:279661)	0.01km d/s from '1'
NA Current Applications in Hand	None		
Refused Applications	None		

**Large non-consumptive
Surface water or LDE search (including searches associated with groundwater)**

Feature	Licence number or reference number	Licence holder or applicant name	Distance and direction
Large non-consumptive abstraction points	None		
Large non-consumptive abstraction reaches	None		
Large non-consumptive abstraction areas	None		
Large non-consumptive impoundments	AN/033/0056/023		29.29km d/s from '1'
HEP Issued Licences	None		
HEP Preapp Recommend to Apply	None		

Designated and protected conservation sites and species

Abstraction point located in

Designation type	Name of site	Relevant abstraction point(s)
National Parks	None	
Heritage Coast	None	
Areas of Outstanding Natural Beauty (AONBs)	None	

Groundwater search

Designation type	Name of site	Distance and direction
Special Areas of Conservation (SACs)	Not Tested	
Ramsar sites	Not Tested	
Special Protection Areas (SPAs)	Not Tested	
Sites of Scientific Special Interest (SSSIs)	Not Tested	
rCSMG Riverine SAC	Not Tested	
rCSMG Riverine SSSI Non European Site	Not Tested	
rCSMG SSSI (possible relevance to flow targets)	Not Tested	
rCSMG SACs with Flow Sensitive Fauna Possible	Not Tested	
Groundwater Dependent Terrestrial Ecosystems (GWDTEs) that are not designated as SSSIs – GW only	Not Tested	
National Nature Reserves (NNRs)	Not Tested	
Local Nature Reserves (LNRs)	Not Tested	
Ancient Woodland	Not Tested	
Scheduled Ancient Monuments (SAMs)	Not Tested	

Local Wildlife Site (LWSs)	Not Tested	
World Heritage Site	Not Tested	
Restoring Sustainable Abstraction (RSA) Programmes	Not Tested	
Current Protected Wetland Sites	Not Tested	
Current Wetland Sites	Not Tested	
Protected species	Not Tested	
Protected habitats	Not Tested	

Surface water or LDE search (including searches associated with groundwater)

Designation type	Name of site	Distance and direction
Special Areas of Conservation (SACs)	Ouse Washes (OID:162755)	25.98km d/s from '1'
	The Wash & North Norfolk Coast (OID:163206)	50.61km d/s from '1'
Ramsar sites	Ouse Washes (OID:142397)	25.01km d/s from '1'
	The Wash (OID:142497)	50.61km d/s from '1'
Special Protection Areas (SPAs)	The Wash (OID:129470)	50.61km d/s from '1'
Sites of Scientific Special Interest (SSSIs)	None	

rCSMG Riverine SAC	None	
rCSMG Riverine SSSI Non European Site	None	
rCSMG SSSI (possible relevance to flow targets)	None	
rCSMG SACs with Flow Sensitive Fauna Possible	None	
National Nature Reserves (NNRs)	None	
Local Nature Reserves (LNRs)	None	
Ancient Woodland	None	
Scheduled Ancient Monuments (SAMs)	None	
Local Wildlife Site (LWSs)	River Lark and Associated Habitat (OID:227713)	4.45km d/s from '1'
World Heritage Site	None	
Restoring Sustainable Abstraction (RSA) Programmes	None	
Current Protected Wetland Sites	None	
Current Wetland Sites	None	
Protected species	River Lamprey migratory route (OID:3931030)	0.00km d/s from '1'

	European Eel migratory route (OID:3923619)	0.00km d/s from '1'
	European Eel (OID:3775761, 3775929, 3968803, 3973219, 3976766, 4010664, 4028437, 4028438, 4028439)	0.64km d/s from '1'
	Bullhead (OID:3776160, 3972207, 4000856, 4004530, 4004531)	1.35km d/s from '1'
	Spined Loach (OID:3983115, 4034652)	1.35km d/s from '1'
	Brook Lamprey (OID:3992609)	3.23km d/s from '1'
Protected habitats	Deciduous woodland (OID:3268945, 3283713, 3290254, 3311554, 3353615, 3353616, 3373296, 3386453, 3428987, 3428988, 3473778, 3505562, 3547972, 3693013, 3733513, 3822391, 3878835, 3893353, 3921464, 3950428, 3988827, 3991749)	0.00km d/s from '1'
	Coastal and floodplain grazing marsh (OID:3801801, 3944685)	0.67km d/s from '1'
	Chalk rivers (OID:3424181)	4.18km d/s from '1'

Maps

Map 1 – Proposed abstraction location

No map generated for this report

Map 2 – Abstraction waterbody extent

No map generated for this report

Map 3 – Downstream search showing 1% of Qn95 screening corridor (100m buffer)

No map generated for this report

Legend

No maps generated for this report

Supplementary Information: Turf Lock Rock Ramp NFPP application

Background

This NFPP application is for the mitigation of Turf Lock on the River Lark near Mildenhall (Suffolk)

The River Lark upstream of Mildenhall has the potential to support rare and valuable chalk stream species. In fact, there are only ~200 chalk streams like this in the world. The River Lark has been identified as a flagship river for The Chalk Stream Restoration Project (<https://www.riverlark.org.uk/>) which may initiate improvements to habitat and ecological status of the River Lark through restoring sustainable abstraction, reducing point and diffuse sources of pollution, enhancing riverine and riparian habitat, and removing/mitigating barriers to migratory species. The Environment Agency (EA) has previously identified two major barriers along the River Lark that inhibit the free movement of migratory fish species along its course; Turf Lock (NGR: TL 70850 74249) and Gas Pool Sluice (TL 71032 74250) (Figure 1.1).

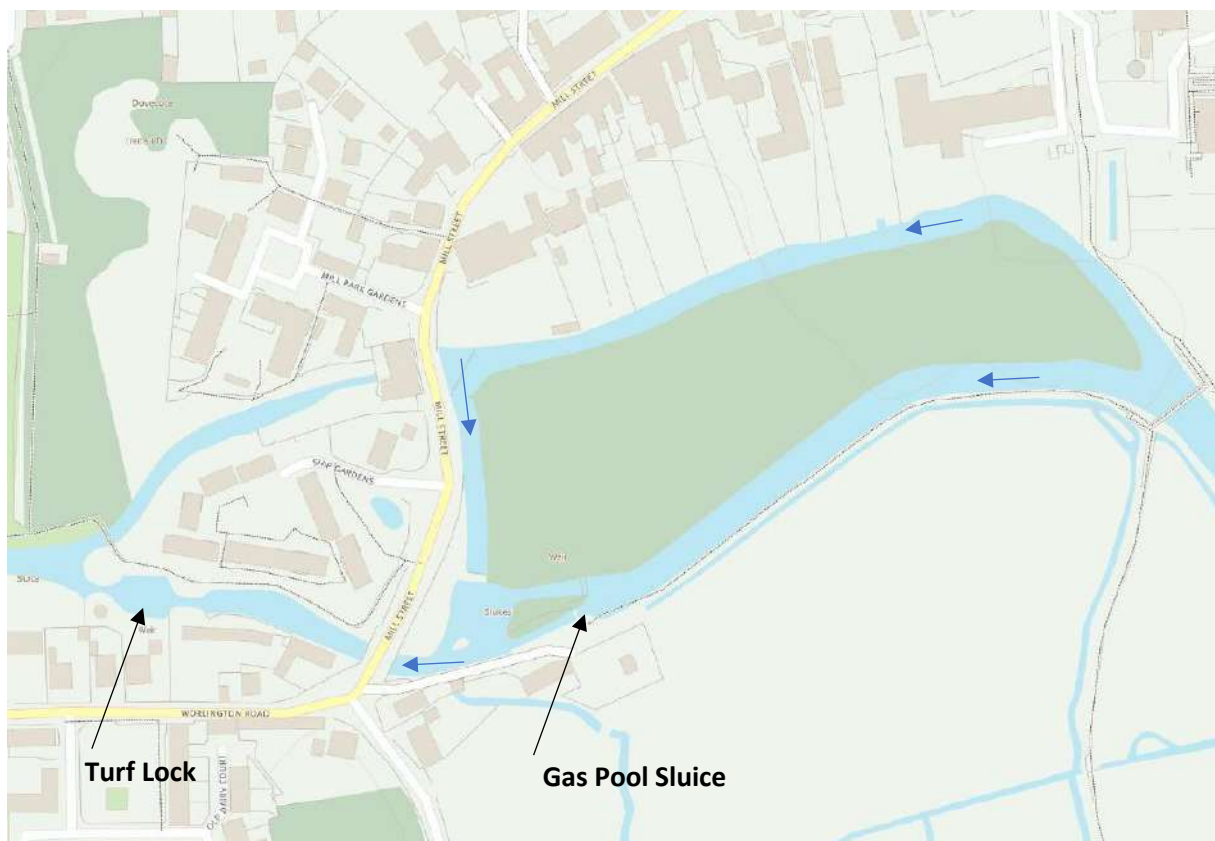


Figure 1-1 Location of Turf Lock and Gas Pool Sluice on the River Lark near Mildenhall, Suffolk. Source: Crown copyright and database rights 2020 Ordnance Survey

Fishtek were asked to develop a concept and outline design of a rock ramp for the site, building on an earlier options appraisal by Atkins and stakeholder engagement by the Environment Agency. Initially Fishtek designed a 2.5% sloped 58 m long rock ramp (Figure 1.2).

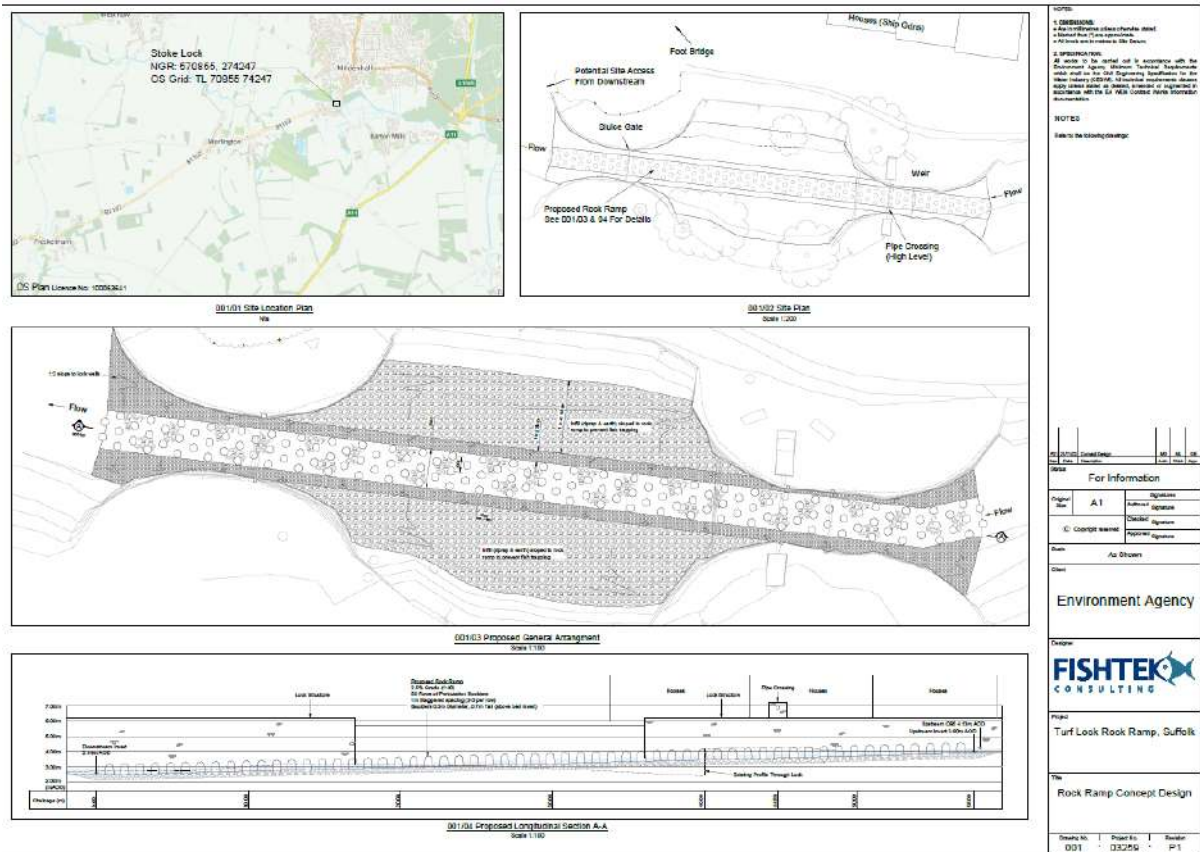


Figure 1-2 Initial rock ramp concept for Turf Lock

Following discussions with Breheny Civil Engineering, the Environment Agency (Chris Bell and James Brokenshire-Dyke), Anglian Water and other stakeholders, it was decided that if the rock ramp could be made steeper and shorter, this would save significantly on construction cost, material use, and carbon emissions in addition to significantly easing buildability and reducing construction risk (i.e. wingwall collapse). As such, a steeper (5% slope, 29 m length) rock ramp was developed to outline design and this is what is being presented as part of the NFPP application.

The structure

A site visit was conducted by Fishtek Consulting on the 15th November 2022. Photographs were collected of Turf Lock (Figure 1-3). The river is fairly constrained around the location of Turf Lock. A public footpath runs along the true right bank top of the River Lark upstream of Turf Lock. Residential properties and gardens border both bank tops of the River Lark upstream of Turf Lock, and residential properties border downstream on the true left side. A sewer pipe crosses the River Lark at the upstream masonry wingwalls of Turf Lock. Owing to the steepness of the upstream channel, the zone of impoundment extends only a few metres upstream of Turf Lock with the channel between Turf Lock and Mill Street Bridge being relatively shallow (0.15 m) and moderately fast flowing. The flow on the day of survey estimated to be $\sim Q_{80}$ based on the upstream flow gauge (River Lark at Temple). The combined structural head of Turf lock was estimated to be ~ 1.46 m from the upstream crest to the river bed level downstream of Turf Lock. A description of the various elements of Turf Lock is provided in Figure 1-4.



Figure 1-3 Photograph of upstream end of Turf Lock captured from the downstream true right bank on 15/11/2022.

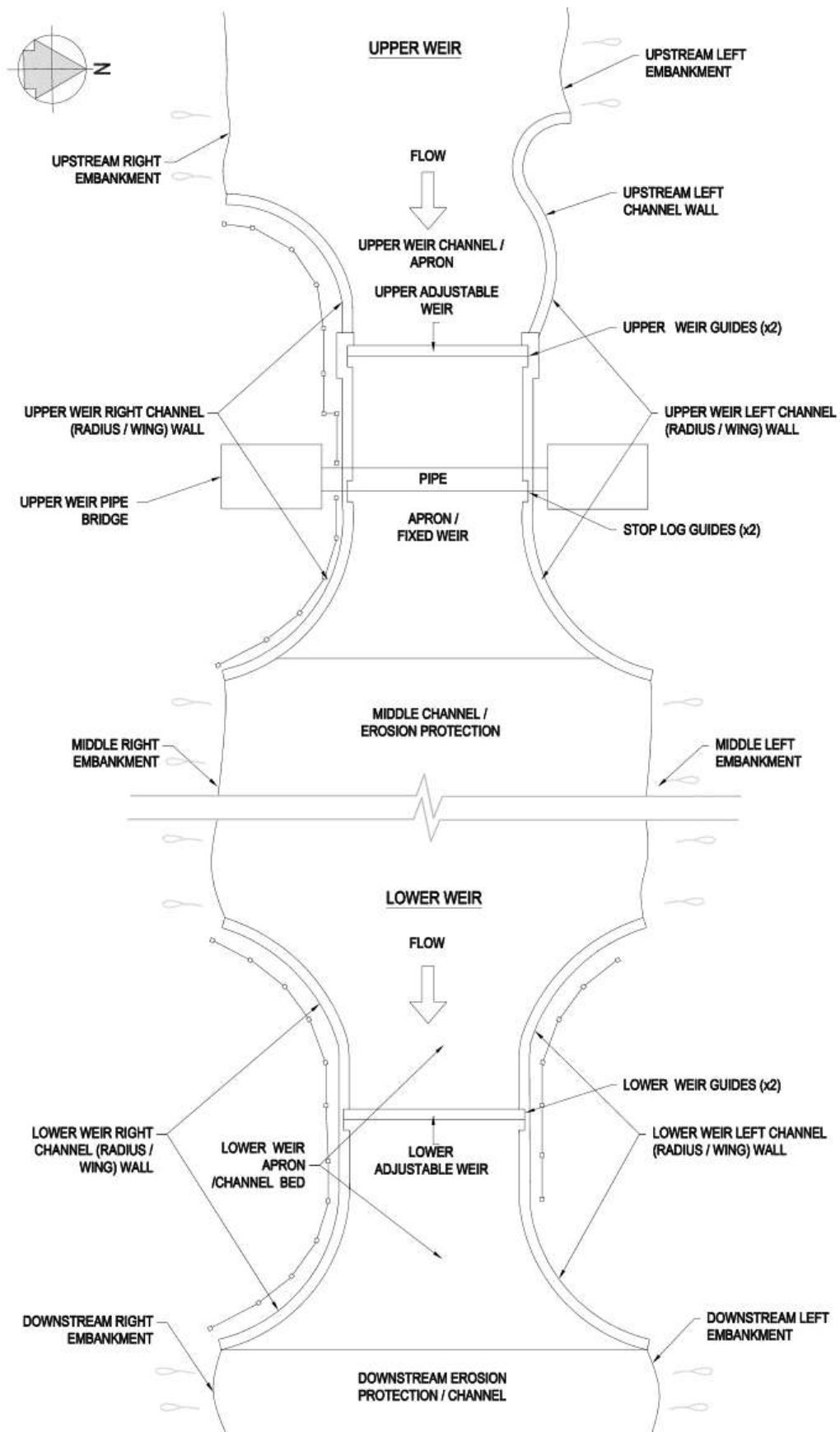


Figure 1-4 Schematic representation of Turf Lock. Source: VBA asset condition inspection report (2019)

Ownership of the structure and banks

James Brokenshire-Dyke from the Environment Agency has confirmed that the Environment Agency own the structure (Turf Lock weir). The left bank is owned by the house on the left bank. The right bank is owned by a management company.

The owners of No.4 cottage, whose garden backs onto the left bank of the structure, are against the removal of Turf Lock (one option that was considered) or the removal of just the wingwall on the true right bank. They also did not want the Environment Agency in their garden to move the raw sewage pipe. The Environment Agency would require their permission as riparian owners in order to do any work at the weir.

Flows

Flow data presented in the NFPP application form are data scaled from the flow gauge on the River Lark at Temple (<https://nrfa.ceh.ac.uk/data/station/info/33014.html>).

The catchment area at Temple gauge is 272 km².
Q₉₅ at Temple = 0.46 m³/s. Q₁₀ at Temple = 2.26 m³/s.

The catchment area upstream of Turf Lock is 315.17 km².
If the gauged flows at Temple are scaled to the catchment size upstream of Turf Lock, then Q₉₅ at Turf Lock = 0.53 m³/s and Q₁₀ at Turf Lock = 2.62 m³/s.

However, there are abstractions between Turf Lock and the gauge at Temple.

Abstractions

There are abstractions between Turf Lock and the gauge at Temple.

- Licence 6/33/37/*S/0363/R01 can abstract from TL 74166 73646 and operate from 1st November to 31st March inclusive and abstract up to 107 m³/hr or 0.0297 m³/s. This licence is unlikely to affect Q₉₅ flows because of the time of year that it can operate over.
- Licence 6/33/37/*S/0420/R01 can abstract from TL 7352 7099, TL 7320 7272 and TL 7394 7369 and can operate from April to October inclusive abstracting up to 0.0202 m³/s. This licence is very likely to affect (reduce) Q₉₅ flows because of the time of year that it can operate over.
- Licence AN/033/0037/029 can abstract from TL 71836 74080 and can abstract from a 100 mm gravity fed pipe all year round. The abstraction rate is unspecified in the licence. A gravity fed pipe will vary in its discharge based on material, length and slope. If we assume it is a plastic pipe with 1 m length and 0.1 slope then abstraction rate would be 0.029 m³/s.

If both of the summer operating abstractions are deducted from the scaled Q₉₅ value we end up with a Q₉₅ value of 0.48 m³/s. If we deduct the winter abstraction of 0.03m³/s from the scaled Q₁₀ value we end up with a Q₁₀ value of 2.59 m³/s.

All river levels presented in the NFPP application form and the outline design reflect the levels with the abstraction taking place as described above.

Other considerations

- The structure is listed on Suffolk County Council 'Heritage at Risk' register, Suffolk County Council want the Environment Agency to liaise with English Heritage and do a listing screening if we were to demolish part of the structure, Suffolk County Council have said that they would not support it without approval by English Heritage. [MNL 456 - Mildenhall Turf Lock; New Lock; River Lark - Suffolk Heritage Explorer.](#)
- Anglian Water raw sewage pipe crosses the River Lark across the structure and would need moving if we demolished part of the structure. No.4's garden would be part of the construction site and this is something they do not want or support. There is a huge cost to moving the pipe which now serves several hundred homes and would need tankering during construction, would have a significant carbon footprint.
- This is an extremely constrained site, access will be along river from a site compound D/S of the structure.
- No.4 is located with 5m of structure any design and method of construction needs to consider the historic structure.
- There is no room to bypass structure due to developments next to the structure.
- Structure is constrained and the area around is liable to flood. The 1980's shelter housing development on the true right bank is built in flood plain, and the mitigation option cannot increase flood risk to these properties.
- Although not evident in the NFPD database, sea trout have been observed in the River Lark near to Turf Lock (James Brokenshire-Dyke pers. comms).
- There is a future focus on restoring the catchment and sustainable abstraction.

From: [Paul George](#)
To: [Melhuish, Graham](#); [PSC-WaterResources](#)
Cc: [Sheldrake, Bobby](#); [Stephen Holland \(Guest\)](#)
Subject: FW: Turf Lock: Progress Meeting 02.07.24 - Notes NPS/WR/040865
Date: 05 July 2024 10:45:45
Attachments: [image001.jpg](#)
[image002.jpg](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)
[image007.png](#)
[Turflock_WR188_InvalidApplication.pdf](#)
[201_3259_Turf Lock DD.pdf](#)
[LIT_10151_-_Form_wr328- application for a water resources licence_part a..pdf](#)
[RE Turf Lock - October NFPP feedback.msg](#)
[Turf Lock fish pass - NFPP submission.msg](#)
[Turf Lock Project Proposal 21_03_2023 \(1\).pdf](#)
[TURFL_2024_200_001.pdf](#)
[TURFL_2024_200_002A.pdf](#)
[Turflock LIT 10157 - Form wr334- application for a water resources impoundment licence – part d.pdf](#)

Dear Graham,

Please see attached documents and below comments.

- A completed [Application for a water resources licence – part A](#) – The part A provided with the application on 12 June 2024 is not the correct form for a water resources licence. Guidance on completing the form can be found [here](#). The information on this document may answer some of the questions below. Updated and attached
- Maps and designs detailing the planned impoundment at Larkhead Sluice and details of the proposed use of the impoundment. This is because there is some distance between this point and the other points applied for and we need to decide whether they can both be included on the same licence. Larkhead Sluice has been removed from the application as levels can be controlled locally around Turflock. Plans and form d have been updated accordingly and are attached
- Confirmation of whether any of the impoundments listed in your application are already in existence and are being altered or whether all works are new impoundments. There are two existing impoundments at lark head sluice, Weirs at the upstream and downstream end. These will be modified. I'm unaware of any existing licence as these are historic structures
- Details of the outcome of discussions with Area fisheries teams (the *Application for a water resources impoundment licence – part D* submitted on 12 June 2024 indicated in Section D6.1 that Eel regulations had been discussed but no further information was provided). Attached
- A report that shows how the designs were arrived at and flows worked out. It should also show that you considered the impact of the proposal on surrounding water users and the water environment. Attached
- A method statement for the operation of the works. To be forward by Stephen Holland at Breheny's asap
- Confirmation of the name of the proposed licence holder. Norfolk Rivers Drainage Board. Forms updated and attached

- Confirmation of which parts of the licence are temporary and which parts are permanent. Plans and forms updated to make this clear.
- We need evidence of your entitlement to apply for a licence. As a minimum, you need to demonstrate that you have a right of access to the locations or that you are currently negotiating a right of access. We can accept written evidence confirming your right of access or permitting lawful occupation (e.g. deed of grant, lease or tenancy agreement). We have a Schedule 3 contract in place, as part of our Public Sector Cooperation Agreement. Powers can be shared between risk management authorities through this agreement, including powers of entry. Is this sufficient? <https://www.ada.org.uk/knowledge/public-sector-cooperation/>

In relation to payment, Bobby mentioned you are looking at getting this waived through a form L? It would be great if this is the case, if not please let me know and I'll arrange for payment to be made via bacs asap.

If you have any questions or need any more information, please do let me know.

Kind regards



Paul George TEng MICE
 Operations Manager
 Norfolk Rivers Drainage Board
 Water Management Alliance
paul.george@wlma.org.uk

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 t: 01553 819600 | e: info@wlma.org.uk | www.wlma.org.uk | What3Words: [caring.employ.visit](#)

WMA members: [Broads Drainage Board](#), [East Suffolk Water Management Board](#), [King's Lynn Drainage Board](#), [Norfolk Rivers Drainage Board](#), [Pevensey and Cuckmere Water Level Management Board](#), [South Holland Drainage Board](#), and [Waveney, Lower Yare and Lothingland Drainage Board](#)

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With our commitment to ISO 14001, please consider the environment before printing this e-mail.

Defenders of the Lowland Environment

From: Tyler, Phillip <Phillip.Tyler@environment-agency.gov.uk>
Sent: Tuesday, June 25, 2024 9:55 AM
To: Stephen Holland (Guest) <s.holland@breheny.co.uk>
Cc: Sheldrake, Bobby <Bobby.Sheldrake1@environment-agency.gov.uk>
Subject: NPS/WR/040865 - Turflock, Mildenhall

Good morning Stephen

Further to our conversation yesterday, I have picked up application NPS/WR/040865 for a new impoundment licence at Turflock and Larkhead Sluice near Mildenhall, Suffolk. I will be involved in validating your application, that is performing the technical checks which mean that we can tell you sooner if we need anything else in relation to your application.

Attached is a letter laying out the information that it is currently missing and the details of the outstanding charges.

As discussed, I have cc'd Bobby Sheldrake for information.

Looking back at the previous application documents I can see that there was initially an application for an enhanced pre-application and, as there seems to be some complexity involved in this application and the information we will need to determine it, that may be worth considering again instead of moving forward with a full application at this time.

If you have any questions don't hesitate to give me a call on the telephone numbers below.

Phillip Tyler

Permitting Officer (Water Resources) – National Permitting Service
Environment Agency | Manley House, Sowton Industrial Estate, Kestrel Way, Exeter, EX2 7LQ

phillip.tyler@environment-agency.gov.uk

Mobile – 07825 901764 | Office – 02030 250894

Do you have a couple of minutes to help my professional development? [Click here](#) if you would like to provide me with some feedback.

Pronouns: he/him/his – [why is this here?](#)

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From: [Bell, Chris](#)
To: [Paul Gratton](#)
Cc: [Sheldrake, Bobby](#); [Thomas, Lewis](#)
Subject: RE: Turf Lock - October NFPP feedback
Date: 30 October 2023 11:51:14
Attachments: [Turf Lock NFPAP Minutes Exerpt Oct 23.docx](#)

Here we are Paul,

Please see Turf Lock minutes.

With best wishes,

Chris

From: Bell, Chris
Sent: 24 October 2023 17:34
To: Paul Gratton <paul@fishtek.co.uk>
Cc: Sheldrake, Bobby <Bobby.Sheldrake1@environment-agency.gov.uk>
Subject: Re: Turf Lock - October NFPP feedback

Hi Paul, yes sorry I forgot Ellis wouldn't be sending them on... Turf went through fine thanks.

Thornborough Mill just needs a slightly lower drop at each barrage to cater for the small fish quotes on the form.

I'll send the minutes tomorrow, away from laptop at mo.

Best for now,

Chris

Sent from my iPhone

On 24 Oct 2023, at 16:56, Paul Gratton <paul@fishtek.co.uk> wrote:

Hi Chris,

Hope you're keeping well. Just wanted to touch base and see if there is feedback available for the re-submission of the Turf Lock designs to the October panel meeting?

Thanks,
Paul

<image002.png>

Paul Gratton BSc MSc MIFM
Principal Fisheries Scientist

Office: +44 (0)1803 866680

Mobile: +44 (0)78536 10502

Email : paul@fishtek.co.uk

Fishtek Consulting

Unit 1A Webbers Way

Dartington

Devon

TQ9 6JY

[<image004.jpg>](#)

My working week is Monday to Wednesday & Friday.

From: [Paul Gratton](#)
To: [Bell, Chris](#); [Brokenshire-Dyke, James](#)
Cc: [Joanna Czyrw](#)
Subject: Turf Lock fish pass - NFPP submission
Date: 19 July 2023 10:30:18
Attachments: [image001.png](#)
[image003.jpg](#)
[image002.png](#)
[image004.jpg](#)
[03259_Turf Lock Outline Design.zip](#)
[Turf Lock NFPP Approval Form \(18.07.23\).pdf](#)
[Turf Lock Constraints and Site Information.pdf](#)
[FDC River Lark at Turf Lock.png](#)

Morning Chris, James,

Please find attached the outline design drawings for the Turf Lock fish pass, alongside the NFPP application form and supporting info for submission to the August panel meeting.

I'm around most of today if there are any immediate queries, but if not we'll wait to hear back on the panel comments next month.

Many thanks,
Paul

Paul Gratton BSc MSc MIFM
Principal Fisheries Scientist

Office: +44 (0)1803 866680
Mobile: +44 (0)78536 10502
Email : paul@fishtek.co.uk

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My working week is Monday to Wednesday & Friday.