The power of collaboration

Report

Kippford WwTW and Pumping Station

Ecological Constraints Report

March 2022

Scottish Water

Report Name / Version no.

Client: Scottish Water

Project: Kippford WwTW and Pumping Station

Document Title: Ecological Constraints Report

m2 Project Code: 420734KNS			Document No: 01		
Version	**Date**	**Description/Amendment**	**Prepared by (Author)**	**Checked by**	**Reviewed by**
A	31.01.20	For Issue	R. Forrester	R. Clisham	C. McMillan
B	28.03.22	For Issue – Updated Location for new WwTW	K. McConnell	R. Forrester	C McPake

PLEASE DESTROY ALL SUPERSEDED COPIES OR CLEARLY MARK THEM AS "SUPERSEDED"
UNCONTROLLED WHEN PRINTED

File Location	Date	Admin Check by
SharePoint Link	15.03.22	KM

OPTIONAL EXTRA IF REQUIRED BY PROJECT MANAGER:

Distribution:								
Name								
Copy No.								

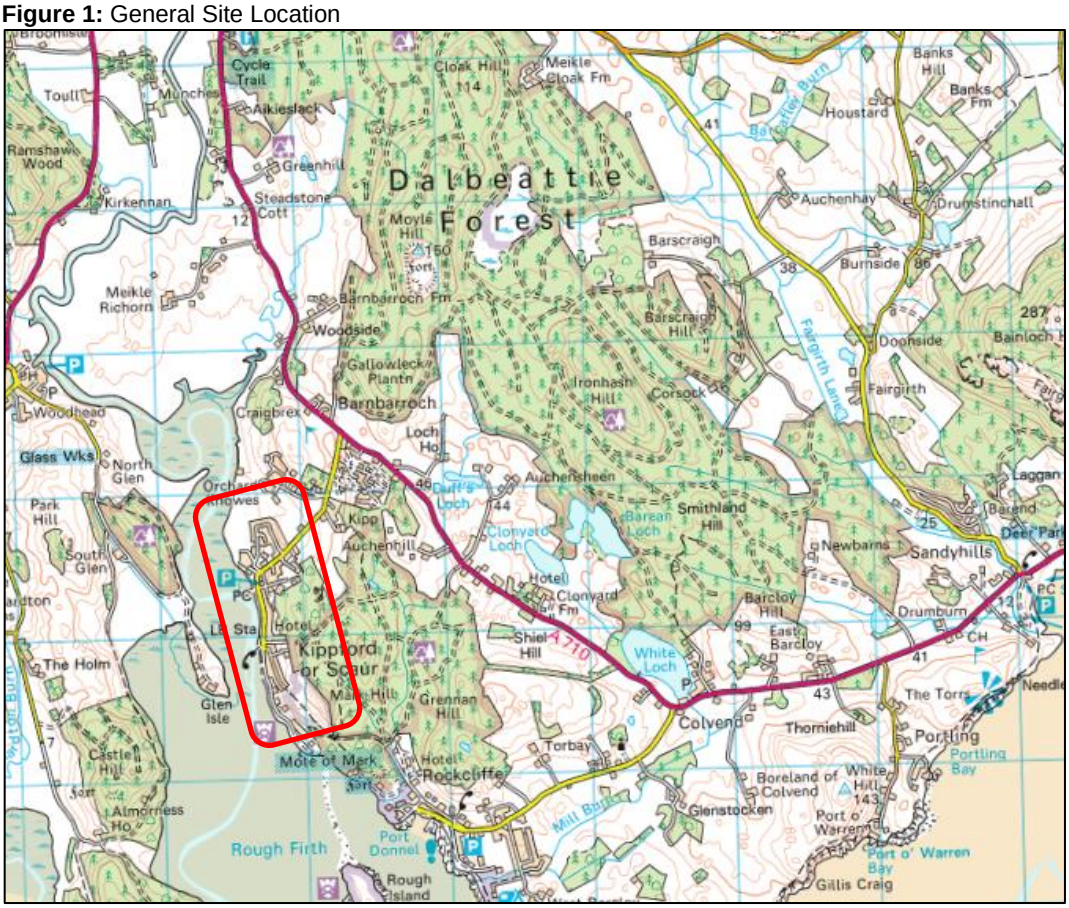
Contents

1 INTRODUCTION

1.1 Background

M² was commissioned by Scottish Water in January 2022 to conduct an ecological constraints survey ahead of works to upgrade the Wastewater Treatment Works (WwTW) at Kippford, Dumfries and Galloway, see ***Figure 1***. M² have previously undertaken an ecological constraints survey for this project in January 2020, however the proposed location for the new WwTW has changed along with slight alterations to the rising mains pipeline, gravity outfall pipeline and outfall location. The site is generally located at NGR[1]: NX 837 550.

Figure 1: General Site Location



Source (OS Mapping accessed January 2022)

1.2 Planned Works

The planned works will involve the construction of a new WwTW plant within an existing agricultural field within the northern extents of Kippford. A new 1050m long rising mains pipeline will be installed connecting the existing WwTW to the new WwTW. The rising mains will follow the route of the road until it connects within the new WwTW.

[1] NGR: National Grid Reference

The new WwTW site is approximately 7700m^2 with a new 775m long gravity outfall pipe leading to an outfall within the Urr Water. ***Appendix A*** shows the overall layout of the planned works.

Following completion of the new WwTW the existing WwTW will be converted to a transfer pumping station which will transfer wastewater to the new WwTW. This would render the existing pumping station building redundant and as such it is scheduled to be demolished.

Construction works are currently scheduled to commence in April 2023 and are expected to be undertaken over several months.

2 METHODOLOGY

2.1 Scope of Ecological Assessment

A desk study was conducted to identify any designated sites of nature conservation importance, protected species records and any existing relevant reports or freely available online information pertinent to the proposed works.

The ecological constraints survey focused on identifying potential and actual ecological constraints relating to the proposed development.

Habitats within the site were identified and mapped in compliance with the '*Handbook for Phase 1 habitat survey: a technique for environmental audit'* (Joint Nature Conservation Committee, 2010). The survey focused on identifying: Habitats of conservation importance (Scottish Biodiversity List, Local Biodiversity Action Plan, Annex 1 habitats of EC Habitats Directive 1992) and any incidence of invasive non-native plant species.

An assessment was also undertaken of the likely presence or absence of protected and notable animal species within the ZoI of the proposed development, primarily including:

- Terrestrial/aquatic mammals inc. badgers *Meles meles*, otters *Lutra lutra*, water voles *Arvicola amphibius* and red squirrels *Sciurus vulgaris*.
- Roosting/hibernating bats.
- Reptiles and amphibians including great crested newts *Triturus cristatus*.
- Breeding and wintering/migratory birds.
- Other protected and/or notable species, where relevant.

Assessments were based on the known distribution of species, habitat suitability and/or direct evidence such as field signs or observations. From these findings, further protected species surveys may then be recommended and/or required.

2.2 Survey Area and Zone of Influence (ZoI)

Current guidance recommends that all ecological features that occur within the ZoI for a proposed development are investigated[2]. This includes those ecological receptors which may be directly affected by the proposed works or those outside of the works footprint, but which could be indirectly affected by works (e.g. by disturbance or downstream impacts).

The survey focused both on the works footprint and the potential ZoI of each site or constituent part of the scheme and for each specific ecological receptor, as defined in ***Table 1***.

Table 1: Zones of Influence and Survey Areas

Ecological Receptor	ZoI/Survey Area
Sensitive Habitats	Works footprint plus 100m
Bats	Works footprint plus 50m
Badgers	Works footprint plus 100m

[2] IEEM (2018) Guidelines on Ecological Impact Assessments in the UK.

Ecological Receptor	ZoI/Survey Area
Birds	Works footprint plus 50m
Otters	Works footprint and nearby watercourses, to distance of 250m up and downstream (where relevant).
Water Voles	Works footprint and nearby watercourses, to distance of 250m up and downstream (where relevant).
Invasive non-native plants	Works footprint corridor plus 50m
Other protected or notable species	Works footprint plus corridor plus 250m, extended to 500m where appropriate in the case of great crested newts.

2.3 Date of Survey and Surveyors

The ecological constraints survey was undertaken by M2 ecologists Kirsty McConnell and Richard Forrester on 6 January 2022.

2.4 Survey Constraints and Limitations

Due to the timing of the commission, the survey was undertaken during a sub-optimal time of year for botanical surveys. As a result, and although broad Phase 1 habitat types could be identified confidently, no exhaustive plant lists were compiled during this survey event. For this reason, it is not possible to confirm the complete presence / absence of all of invasive non-native plant species within or in proximity to the planned works. However, all effort was made to note any live or dead signs of invasive non-native plant species (INNS).

Access was not permitted into private land out within the planned works boundary. As such protected species surveys were not possible within the entire ZoI of the planned works. However, assessments have been made, where appropriate, for the potential for protected species to be present out with the surveyed area.

3 RESULTS

3.1 Designated Sites of Nature Conservation Importance

A review of online databases[3] confirmed there are currently no statutory or non-statutory designated sites for nature conservation with 2km of Kippford.

The western boundary of the Solway Firth Special Area of Conservation (SAC) and the Upper Solway Flats and Marshes Special Protection Area (SPA) is located over 5km to the east of the mouth of Urr Water (the Rough Firth), which is in turn over 4km downstream from the proposed new WwTW outfall location.

The Solway Firth SAC is designated for supporting a range of Annex I habitats including Atlantic salt meadows, estuaries, dune grassland, intertidal mudflats and sandflats, coastal shingle vegetation, subtidal sandbanks, glasswort and other annuals colonising mud and sand and reef habitats. The site also supports a number of Annex II species including river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus*.

The Upper Solway Flats and Marshes comprises extensive areas of intertidal mudflats, fringing saltmarshes and grazing marshes. The SPA site qualifies under Article 4.1[4] by supporting internationally or nationally important wintering populations of the Annex 1 listed barnacle goose *Branta leucopsis* including 100% of the Svalbard population, all of which winters in Britain, whooper swan *Cygnus cygnus*, and golden plover *Pluvialis apricaria*.

The site also qualifies under Article 4.2 as a Wetland of International Importance, by regularly supporting internationally important wintering populations of migratory waterfowl species and a large wintering assemblage of waders.

The planned works will be discrete to the village of Kippford and are unlikely to directly affect the habitats or qualifying features within the above described SPA/SAC. Notably, following completion of the new sewage treatment infrastructure at Kippford, water quality downstream of Kippford is anticipated to be greatly improved, leading to positive impacts on the wider estuarine environment. However, there remains potential for downstream pollution events into estuarine area to occur during construction (from e.g. pipeline and outfall works) which could be washed downstream impacting the qualifying habitats of the SAC or the qualifying features of the SPA.

Depending on the time of year the works are undertaken (i.e. nominally between October to March), there is also potential for ex-situ species associated with the SPA (wildfowl and waders), could be present within the intertidal habitats of the Urr Water, and within the potential ZoI of the works. In the event these species are present during the works there is potential for disturbance (noise, physical). However, this is not likely to result in a significant effect given the relative numbers of SPA associated birds which would be expected to be supported within the ZoI of the proposed scheme.

[3] https://www.nature.scot/information-library-data-and-research/snhi-data-services
[4] EC Directive 79/409 on the Conservation of Wild Birds (the Birds Directive)

Recommendations for further assessment of impacts to the SAC and SPA are detailed within Section 4.1. Further recommendations to minimise the potential for pollution impacts are detailed within Section 4.2.

3.2 Habitats

The locations of all habitats are shown on the Phase 1 habitat map in ***Appendix A***, with associated Target Notes in ***Appendix B***. Target Notes are referred to as TN1, TN2 etc. in the following sections.

3.2.1 Existing WwTW

Habitats within the area of the existing WwTW (TN1) are restricted to a patch of amenity grassland, three small trees, including a mature willow-leaved cotoneaster tree *Cotoneaster salicifolius*, areas of introduced shrubs and a small building, see Photograph 1 below.

Photograph 1: Existing Kippford WwTW

No impacts to the above identified habitats are predicted as a result of the works. In the event site compounds were required to be set up surrounding the existing WwTW, impacts would be restricted to amenity grassland areas which are considered to be of low ecological value.

3.2.1 Rising Main Pipeline Route

The entire 1050m rising mains pipeline connecting the existing Kippford WwTW with the new WwTW, will be contained within tarmac roads (see Permanent Works Layout, ***Appendix C***.)

The rising mains corridor will be located within Rough Firth Road, which runs parallel with the west bank of Urr Water. The road is separated from the adjacent intertidal habitats by a sea wall which runs between the existing Kippford WwTW and Kippford Marina. Conversion of the existing Kippford WwTW to a pumping station, and construction of the new rising main are not anticipated to directly impact these adjacent intertidal habitats.

The rising mains pipeline continues along the Rough Firth Road heading east before north connecting with the proposed new WwTW at NGR: NX 83964 55684.

3.2.2 Proposed Site of New WwTW

The proposed site for the new Kippford WwTW (TN2), see Photograph 2, is located to the northwest of the Rough Firth Road at NX 83945 55748. Habitats here consist of poor semi-improved grassland with species here dominated by Yorkshire fog *Holcus lanatus*, with abundant meadow buttercup *Ranunculus acris*, cock's-foot *Dactylis glomerata* and clover *Trifolium sp.*, frequent areas of soft rush *Juncus effusus* and jointed rush *Juncus articulatus* are present throughout, along with occasional bugle *Ajuga reptans*, cats-ear *Hypochaeris radicata* and chickweed *Stellaria media*. Small patches of scrub habitat predominantly consisting of gorse *Ulex europaeus* and bramble *Rubus fruticosus* are also scattered around the edges of the field. A small area of scrub is also located in the southwestern corner consisting of group of approximately 10-15 immature birch *Betula sp.* trees. Photograph 2 provides are overview of the proposed site of the new WwTW.

Photograph 2: Proposed Site of New WwTW

A small ephemeral watercourse, see Photograph 3, is present cutting through the agricultural field, this watercourse is fed by rainwater and run-off from the Rough Firth Road, originating from an overflowing road drainage pipe which is being washed into the field. It is likely that this is only present during periods of heavy rainfall. Soft rush and jointed rush are dominant along the edges of the watercourse.

Photograph 3: Ephemeral Watercourse Within Proposed Site of New WwTW

A small block of mixed plantation woodland, consisting predominantly of sycamore *Acer pseudoplatanus*, beech *Fagus sylvatica,* ash *Fraxinus excelsior*, oak *Quercus sp.* and birch with frequent Scot's pine *Pinus Sylvestris*, is located to the west of the proposed site for the new WwTW. Broadleaved and mixed plantation woodland is defined as a priority habitat within the Dumfries and Galloway LBAP, however this habitat is out within the planned works area and will not be directly impacted.

Terrestrial habitats located within the proposed site for the new WwTW are not listed as a priority habitat within the Dumfries and Galloway LBAP or within the SBL. The above identified habitats which will be directly impacted i.e. small areas of scrub and semi-improved grassland are assessed to be of low conservation importance.

3.2.3 Gravity Outfall Pipeline and Outfall Location

The new WwTW requires a final effluent outfall pipe (i.e. a gravity outfall pipeline). This will extend northwest from the new WwTW across an improved grassland field before heading south west across two more improved grassland fields before entering an area of fringing saltmarsh/coastal floodplain grazing marsh (merse) and intertidal mudflats, towards the proposed location of the outfall structure on Urr Water (see Permanent Works Layout, Appendix C).

Coastal saltmarshes (merse) and intertidal sand and mudflats are both listed as a priority habitat within the Dumfries and Galloway LBAP[5]. Intertidal mudflats and various types of saltmarsh communities are also listed in the Scottish Biodiversity List[6].

Both walkover surveys were undertaken in January (in 2020 and 2022) and outside of the vegetative growth season. Hence a detailed habitat survey was not undertaken. However, the area of saltmarsh affected by the proposed construction of the new outfall was noted to be heavily grazed and poached in places by cattle.

Construction of the gravity outfall pipeline and new outfall will result in changes to the dynamic process of erosion, uplift, transportation and deposition of sediment which could result in impacts to the hydrology / processes within the mudflat and saltmarsh habitats. However, given its location it's expected that the increase in sediment and any changes to the fluvial processes would be limited impact.

The remains potential for damage to intertidal mudflats and saltmarsh habitats in the event of pollution events during construction, particularly during the construction of the outfall which has the potential to wash concrete, fuel etc. downstream.

Recommendations are provided within Section 4.2 to minimise impacts to habitats of conservation concern.

3.3 Invasive Non-Native Species

The Wildlife and Countryside Act 1981 is the principle domestic legislation concerning non-native species. It was significantly strengthened by the Wildlife and Natural Environment (Scotland) Act 2011. This legislation makes it an offence to deliberately or recklessly cause the spread of species beyond their native range.

A small area of invasive non-native species rhododendron *Rhododendron ponticum* (TN3) was identified within an area of scrub within the southern extent of the new site for the proposed WwTW, see Photograph 4.

The proposed new WwTW site will be cleared to allow for the construction of the new WwTW and as such site facilitation works are likely to require the removal of the INNS rhododendron. Recommendations are detailed within Section 4.3 to manage the risk of spreading this species.

[5] https://www.dumgal.gov.uk/media/19945/Local-Biodiversity-Action-Plan/pdf/Local_Biodiversity_Action_Plan.pdf

[6] The Scottish Biodiversity List is a list of species and habitats that Scottish Ministers consider to be of 'principal importance' for biodiversity conservation in Scotland. The list helps public bodies carry out their 'duty to conserve biodiversity' by identifying the species and habitats which are the highest priority for biodiversity conservation in Scotland.

Photograph 4: Small area of Rhododendron

Stands of rhododendron and bamboo *Phyllostachys sp*. (TN4) were noted to be present close to the route of the rising mains pipeline at approximate NGR: NX 83691 55445 and NX 83684 55430, respectively. The bamboo was mainly contained within the garden of a private residence, however a number of stems were noted to be growing outside of the garden's boundary fence. A single mature willow-leaved cotoneaster tree is located to the south of the existing Kippford WwTW.

Given the location of the bamboo and rhododendron adjacent to the rising mains pipeline, they are unlikely to be impacted the planned works. Furthermore, cotoneaster tree at the existing Kippford WwTW is not expected to be directly impacted by the planned works. However, precautionary mitigation is recommended within Section 4.3, to effectively manage and zone-off affected areas to minimise the risk of spreading these species of non-native flora.

3.4 Protected and Notable Species

3.4.1 Bats

There are at least nine species of bat found in Scotland. Bats are protected by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland). Most species of bat in Scotland are Scottish Biodiversity List priority species with eight also noted as a priority species within the Dumfries and Galloway LBAP.

3.4.4.1 Existing Kippford WwTW

The existing Kippford WwTW (TN1), see Photograph 5, is located at NX 83730 54807 within the southern extent of the proposed works. The building has previously undergone a Preliminary Roost Assessment (PRA) by M2 ecologists for a separate project in November 2020 which included an internal and external inspection for potential roosting features and evidence of bats. No evidence of bats was identified during this survey. However, the building was assessed to retain moderate suitability to support bats during the core active period (nominally April – September / October) as well as potentially during milder winter weather when bats can become periodically active.

The 2022 site visit confirmed that the building continues to retain moderate suitability for roosting bats. Opportunities identified in 2020 remain including a continuous gap between the blockwork and the metal roof facia, see Photograph 6. As noted in 2020 extensive ivy *Hedera helix* growth continues to be present along the northern elevation obstructing any access to this facia.

Although no field signs of bats were noted during any of the PRA inspections undertaken in 2020 or during the 2022 surveys, this does not confirm the absence of bat roosts from this building.

Photograph 5: Small building associated within the existing Kippford WwTW.

Photograph 6: Gaps between granite block work and roof facia which may permit access by roosting bats.

The existing Kippford WwTW building is currently scheduled for demolition. Demolition of the building could potentially result in the following impacts to bats:

- Death or jury to individual bats if present within the building during demolition.
- Destruction of bat roosts if present within the building.
- Disturbance to roosting bats, if present within the building during demolition.

As such, recommendations to minimise the potential impacts are detailed within Section 4.4.1.

3.4.4.2 Proposed site of new WwTW

No trees located within the proposed site of the new WwTW were assessed retain bat roost suitability.

3.4.4.3 Proposed Gravity Pipeline

A small group of mature broadleaved trees (TN6) was identified at approximate NGR: NX 83852 55837, within 5-10m west of the gravity outfall pipeline. Three of these trees, see Photograph 7, were assessed to retain moderate suitability to support roosting bats during the core active season (nominally April – September / October) and potentially during milder winter conditions. Features within these trees consist of cavities within the main stem created by rot holes and woodpecker holes.

Photograph 7: Mature Ash Trees Retaining Moderate Suitability

Two mature ash trees (TN7) are found to the east of the gravity outfall pipeline, within 5-10m, located at approximate NGR: NX 83852 55837, see Photograph 8. Features within these trees largely consist of small cavities within the branches and sections of broken branches. Both trees are assessed to retain low suitability to support roosting bats during the core active season (nominally April – September / October) and potentially during milder winter conditions.

Photograph 8: Ash trees retaining low bat roosting suitability

An additional row of mature trees (TN8) are present along the western boundary of an improved grassland field at approximate NGR: NX 83686 55862, approximately 5m from the gravity outfall pipeline route. These trees have been assessed to retain low suitability to support roosting bats during the core active season and milder winter conditions.

Where works (i.e. felling, pruning and/or potential damage to root-zones) will operate within 10m or directly impact the aforementioned trees retaining bat roosting potential (TN6, TN7, T8 in Appendix A), there remains potential for impacts to bats and their roosts. Risks to bats during aforementioned active periods may include:

- Death/ injury to crevice roosting bats if present at roost sites at the aforementioned trees when works (which may impact these trees) are conducted.
- Destruction of bat roosts (if present) in the event the trees are accidentally damaged, or their roots encroached upon.
- Disturbance to any bats roosting in favourable features at trees at the time of the proposed works, if present.

As such, recommendations to minimise the potential impacts are detailed within Section 4.4.1.

3.4.2 Otters

Otters are protected under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). They are a European Protected Species (EPS) and a priority species within the

Scottish Biodiversity List as well as a priority species within the Dumfries and Galloway Local Biodiversity Action Plan (LBAP).

A desk study identified multiple instances of otter within 2km of the planned works. The most recent of these being from 2021 within the Kippford Community Nature Reserve located 1.6km from the proposed new WwTW site.

No otter rest sites / holts or evidence of the species was identified during the survey undertaken in 2022.

While no rest sites were identified, estuarine habitats in the immediate vicinity of the existing Kippford WwTW were assessed to offer suitability for sheltering otters, particularly within the coastal defences (rock armour) located on the shoreline either side of the existing WwTW. Existing levels of anthropogenic disturbance, particularly associated with the proximity of a road, jetties, a number of adjacent houses, gardens with dogs etc., means otters are more likely to utilise less disturbed stretches of the Urr Water (i.e. the opposite banks or areas up and downstream of Kippford village).

Otters are known to be present along the Urr Water and therefore the potential for them to be in the vicinity of the works remains. Presence of the species was confirmed during the 2020 survey undertaken by M2. Fresh otter spraint (TN5) was identified along the banks of Urr Water at approximate location NGR: [redacted], see Photograph 9.

Photograph 9: A fresh otter spraint (2020 survey)

Given the potential for otters to be present in and around the working areas, the following impacts have the potential to occur:

- Direct harm or mortality of individuals due to entrainment of otters within excavations falling into deep excavations, poisoning after ingesting chemicals/fuels.
- Damage to otter habitat (i.e. Urr Water) through accidental sedimentation or pollution events.

Therefore, precautionary recommendations are detailed within Section 4.4.2.

3.4.3 Badgers

Badgers and their setts are comprehensively protected by the Protection of Badgers Act 1992 external site (as amended by the WANE Act 2011) against damage/ obstruction to a badger's place of shelter (i.e. occupied sett) and disturbance/ harm to individuals. Badgers are also listed as a priority species within the Dumfries and Galloway Local Biodiversity Action Plan (LBAP).

A desk study identified multiple instances of badger within 2km of the planned works. The most recent of these being from 2021 located 1.8km from the proposed new WwTW site.

Anecdotal evidence from residents to the west of the new WwTW location suggests the presence of badger within the area. A thorough search of this area did not highlight the presence of any setts or evidence of the species. Potential snuffle holes were identified within some residential gardens. Furthermore, areas of nearby woodland was identified to have rocky outcrops and as such likely to have a shallow bedrock not conducive to sett construction. As such is it likely that badger use this area for commuting and potentially foraging.

Habitats within the vicinity of Kippford (particularly to the east) remain ostensibly suitable to support badger. Nevertheless, no badger setts and/or field signs indicated of badger were noted during the survey.

Given the potential presence of badgers in and around the working areas, the potential impacts include:

- Direct harm or mortality of individuals due entrainment of badgers within excavations falling into deep excavations, poisoning after ingesting chemicals/fuels.

Therefore, precautionary recommendations are detailed within Section 4.4.2.

3.4.4 Breeding Birds

All wild birds in the UK are protected under the Wildlife and Countryside Act 1981 (as amended). Some rarer species or those that are more vulnerable to disturbance or persecution receive further protection under Schedule 1 of the Act.

As the survey was conducted in mid-January and outside of the main bird breeding season (nominally March to August), no incidences of breeding activity or behaviour were either expected or noted. However, anecdotal evidence suggests that tawny owls *Strix aluco* are present within a small area of broadleaved woodland to west of the proposed site for the new WwTW / gravity outfall pipeline. A small number of broadleaved trees (TN6) located at NGR: NX 83852 55837 were assessed to retain potential to support tawny owls during the breeding season due to the presence of moderate sized cavities within the main stem of the trees. These trees are located approximately 10m west of the gravity outfall pipeline route and as such are not expected to be directly impacted by the works.

The existing Kippford WwTW also retains suitability to support nesting birds during the main breeding bird season with evidence of old nests identified internally within the building.

In addition to these trees several areas within the ZoI were assessed during the survey as potentially providing suitable nesting habitat during the main breeding season. These are:

- Around the existing Kippford WwTW, mainly comprising of patches of introduced scrub (TN 1).
- Patches of scrub and dense areas of juncus throughout the proposed site of the new WwTW (TN2).
- Areas of scrub and broadleaved semi-mature / mature trees along the proposed gravity outfall pipeline route.
- Suitable ground nesting habitat within the new WwTW site and along the route of the gravity outfall pipeline.

The clearance of trees, scrub and ground vegetation to facilitate construction will likely lead to the temporary / permanent loss of habitats of particular value to breeding birds.

This along with the demolition of the existing Kippford WwTW and other potential physical and ecological impacts during the construction phase of the project may include, but are not limited to:

- Direct harm or mortality of individuals.
- Loss of nest sites, and/or displacement from breeding territories.
- Loss of foraging habitat.
- Noise disturbance.

Therefore, recommendations are provided within Section 4.4.5 to mitigate the risk of breeding birds during construction activities.

3.4.5 Wintering/Migratory Birds

The intertidal habitats of Urr Water provide suitable foraging and roosting habitat for a host of wildfowl and wader species, including those associated with the upper Solway Flats and Marshes SPA. This is with the exception of the stretch of coastline between the existing WwTW and Kippford Marina which is heavily affected by anthropogenic disturbance associated with the proximity of the road, houses etc, but also the presence of jetties and slipways, all of which are likely to deter foraging birds from using these areas regularly.

Beyond Kippford, and in areas upstream and within the ZoI of the proposed construction of the new WwTW and associated outfall, habitats are far less disturbed and are more likely to be used by foraging wildfowl and waders.

Species noted during the 2020 walkover survey included: curlew *Numenius arquata* (including a flock of around 50 birds observed a short distance upstream of the proposed outfall location), oystercatcher *Haematopus ostralegus*, wigeon *Anas Penelope*, mallard *Anas platyrhynchos* and common gulls *Larus canus*.

No species were identified during the 2022 walkover survey, likely due to the heavy rain experienced.

Depending on the timing of the works there is potential for construction to result in the following impacts:

- Damage / loss of foraging habitat to overwintering / migratory birds.
- Noise disturbance and temporary displacement of overwintering / migratory birds if present within proximity to the works during construction.

Therefore, recommendations are provided within Section 4.4.5 to mitigate to wintering / migratory birds during construction. Recommendations provided within Section 4.1 will minimise / mitigate impacts to foraging habitats.

3.4.6 Water Voles

Water voles are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). In Scotland, the legal protection associated with this listing is currently restricted to the water vole's places of shelter or protection and does not extend to the animals themselves, however, full protection covering the animals themselves is proposed. Water vole are also a Scottish Biodiversity List as well as a priority species within the Dumfries and Galloway Local Biodiversity Action Plan (LBAP).

A desk study identified the presence of water vole within 2km of the planned works. The most recent of these being from 2020 within the Kippford Community Nature Reserve located 150m east of the rising mains pipeline.

A small ephemeral watercourse is present cutting through the middle of the agricultural field of the new WwTW location. No field signs of the species were noted. It is likely that this watercourse is only present during periods of high rainfall and as such is not deemed suitable to support water voles.

As a result, water voles will not be considered further within this report.

3.4.7 Reptiles and Amphibians

All reptiles and amphibians are given limited protection under the Wildlife and Countryside Act (1981) (as amended). Great crested newts, natterjack toads are given strict protections under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).

Dumfries & Galloway is the only part of Scotland to support all Scottish native species of reptile and amphibian, including common lizard *Zootoca vivipara*, slow worm *Anguis fragilis*, adder *Vipera berus*, great crested newt, smooth newt *Lissotriton vulgaris*, palmate newt *Lissotriton Helvetica*, common toad *Bufo bufo*, natterjack toad *Epidalea calamita*, and common frog *Rana temporaria*.

All these species occur most frequently along the Solway coast, but common lizard, adder, palmate newt, common toad and common frog are more widespread. Adder, great crested newt and natterjack toad are all listed as priority species within the Dumfries and Galloway LBAP. While common toad, natterjack toad, slow-worm, great crested newt, sand lizard, adder and common lizard are all SBL species.

A desk study identified the following reptiles and amphibians within 2km of the proposed works: adder, slow worm, common lizard, common toad, common frog, palmate newt and smooth newt.

Habitats within and in proximity to the works remain suitable to support amphibians and reptiles. A number of accessible waterbodies were assessed for their potential to support great crested newts. This includes the area of swamp at NGR: NX 83654 55437, which was identified as being brackish and unsuitable, as well as inundated fields / ponds identified on OS mapping at NGR: NX 83686 55966, which during the surveys were noted to be small ephemeral scrapes unsuitable for great crested newt. Two additional ponds were identified located approximately 45m (TN11) at NGR: NX 83909 55863 and 70m (TN12) at NGR: NX 83873 55857, from the planned gravity pipeline route respectively with no works directly impacting these areas. Both ponds were located within private land and access wasn't possible to undertake a Habitats Suitability Index (HSI), however were assessed from the field boundary (especially TN12). The ponds are likely to be man-made and are set in a managed (landscaped) area, separated from the works by a ditch and public road. Furthermore, both of these ponds are relatively isolated within the landscape with no other suitable waterbodies within close proximity (i.e. 500m) which is likely to form a barrier to colonisation by great crested newts if present within the wider area.

There remains potential for reptiles and other amphibian species to be present. However, it is assessed that great crested newts are likely absent from the works area.

A large pile of boulders (TN9) is present along the route of the new gravity pipeline directly north of the proposed site of the new WwTW at approximate NGR: NX 83866 55822, see Photograph 10. This area has the potential to provide a suitable refugia and hibernation site for many of the species listed above and could potentially support some reptile species during summer months.

Photograph 10: Potential reptile / amphibian habitat within the proposed site for the new WwTW.

There remains potential for amphibian and reptile species to be present.

Given the potential for reptiles and amphibians to be present in and around the working areas, the following impacts have the potential to occur:

- Direct harm or mortality of individuals due to entrainment of individuals within excavations falling into deep excavations, poisoning after ingesting chemicals/fuels.
- Destruction to suitable reptile hibernacle (i.e. pile of boulders) through removal to facilitate the construction of the outfall pipeline route.
- Damage to supporting habitats (i.e. areas of rank grassland and scrub) during the stripping of vegetation to allow the construction of the new WwTW.

Therefore, recommendations are provided in Section 4.4.3 for further assessment and to minimise impacts to reptiles and amphibians.

3.4.8 Migratory and Resident Fish

Migratory salmonids are protected by the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 which consolidated the vast majority of the Scottish salmon and freshwater fisheries law into a single Act. Offences include: knowingly injuring or disturbing salmon spawn; or disturbing spawning bed, bank or shallow and obstructing the passage of salmon to spawning grounds during the annual close time.

The Marine Scotland National Marine Plan Interactive Map[7] highlights the Urr Water as a salmonid river. Habitats in proximity to the outfall works are estuarine consisting of intertidal mudflats which do not hold any suitability for spawning salmon *Salmo salar* or sea trout *Salmo trutta morpha trutta*. However, the outfall location is situated along a migration route for

[7] Marine Scotland - National Marine Plan Interactive (atkinsgeospatial.com) (accessed 25th January 2022)

this species. In-river works particularly during the migration runs (nominally spring and autumn months) have the potential to result in direct harm or disturbance (noise, vibration etc) to salmonids.

There is potential for the works to result in adverse impacts to other migratory fish such as the priority species river lamprey*, sea* lamprey*, or* European eel *Anguilla anguilla,* as well as resident fish such as flounder *Platichthys flesus*. This would primarily be a result of noise and vibration impact during construction (again particularly during periods of migration) as well as damage to habitats associated with accidental pollution events and direct mortality of fish.

Recommendations for avoiding or minimising impacts with regards to migratory and resident fish are detailed within Section 4.4.6. Recommendations for minimising impacts to aquatic habitats are found within Section 4.2.

3.4.9 Other Protected and Notable Species

No signs of any other protected or notable species were identified during the site visit.

The desk study identified multiple of red squirrel within 2km of the planned works. The closest of these was recorded in 2020 located within the area mixed plantation woodland to the west of the new proposed WwTW site. No evidence of red squirrel or dreys was identified during the site visit. However, habitats adjacent to the planned works remain suitable. Furthermore, a squirrel feeder was noted to be present on one of the trees at approximate NGR: NX 83842 55806, 20m west of the outfall pipeline route.

The desk study also identified the presence of pine marten *Martes martes* within 2km of the planned works. Records of pine marten were recorded within the area of coniferous woodland approximately 1.6km south of the new proposed WwTW site. No evidence of this species was identified within the site visit, however habitat adjacent to the planned works remain suitable.

Given the suitability of the surrounding works area to support additional protected species, there remains potential for the following impacts to occur:

- Direct harm or mortality of individuals due to entrainment of individuals within excavations falling into deep excavations, poisoning after ingesting chemicals/fuels.

As such it is recommended that precautionary mitigation detailed within Section 4.4.2 is adhered to.

4 RECOMMENDATIONS

The following recommendations are provided in relation to ecological constraints identified along the works corridor to ensure the client meets its legal obligations and to minimise impacts to identified ecological receptors.

Should there be any change to the proposed works, an ecologist should be consulted with regard to potential impacts on ecological receptors and/or any additional mitigation requirements not already prescribed in this report.

4.1 Statutory Requirements

The following recommendations are provided to further investigate the potential for impacts to designated sites of nature conservation as well as inform necessary licences for works in marine/estuarine zones:

- It is recommended that consultation is undertaken with Nature Scot regarding the requirement for a Habitat Regulations Appraisal (HRA) for the project in relation to the potential for impacts (positive and adverse) to the Solway Firth SAC and Upper Solway Flats and Marshes SPA. This would be relevant to the planned works (especially pipeline and outfall in intertidal zones) as well as for changes in water quality from the new WwTW/outfall).
- It is assumed that the works on the outfall and pipeline will be covered by a marine licence. It is recommended to consult Marine Scotland at the earliest suitable time to discuss scheme design, mitigation and construction programme. This may highlight additional expectations which have not been specifically identified within this report including e.g. further detailed botanical surveys of saltmarsh habitats, or extra mitigation to protect the marine environment.

4.2 Habitats

The following recommendations are provided to minimise impacts to habitats during the works:

- The design and location of the new outfall should minimise impacts to saltmarsh and mudflat habitats are far as is possible.
- The design of the outfall and expected flows should consider and minimise impacts of fluvial / estuarine erosion, sediment uplift, transportation and deposition.
- During the pipeline and outfall construction works on the Urr Water, habitat disturbance (i.e. tracking of heavy machinery, storage of machinery and equipment etc.) should be minimised within saltmarsh and mudflat habitats. Works should be kept within a minimal working corridor to limit the area of impact to these habitats. Low ground-pressure tracked vehicles should be used and/or the use of ground matting within habitats sensitive to disturbance and damage (e.g. saltmarsh).
- A full suite of Pollution prevention measures should be implemented to negate adverse impacts to riverine/marine habitats, including current Scottish Environmental Protection Agency (SEPA) Guidance for Pollution Prevention (GPPs) and CIRIA guidance.

- An appropriate disposal/ recycling container for plastics etc. should be kept on site and highlighted to all site personnel, to avoid such items finding their way into the river/ sea. At least 8 million tons of plastics end up in our seas and oceans every year[8]. Marine species (including marine mammals) can ingest and/or entangled by plastic debris which can cause severe injury and death.

4.3 Invasive Non-Native Plants

Due to the identification of INNS on site, it is advised that the following recommendations are adhered to.

- Toolbox talks and / or signage should warn contractors and sub-contractors of the presence of rhododendron, cotoneaster and bamboo on site along with the legal implications of spreading these species. It is also advised that details of the INNS are included within a contractor's method statement to ensure that all site staff are aware of the potential impacts and what methods are required during the works.
- Where possible, excavation, or other activities which could disturb topsoil's in proximity to rhododendron, cotoneaster or bamboo stems should be avoided.
- In the event that the rhododendron, cotoneaster or bamboo is required to be cleared, arisings should be carefully separated, taken off site and disposed of appropriately (i.e. at a licenced facility). Where there are excavations within this area, any soils which are potentially contaminated by INNS should also be disposed of appropriately (as above).

4.4 Protected and Notable Species

4.4.1 Bats

To avoid negative / minimise any potential impacts to bats, the following precautionary mitigation is recommended:

- Prior to the demolition of the existing WwTW, it should be subject to two presence / absence bat surveys during the core active period (nominally March – October inclusive). At least one of these surveys should be undertaken within the bat maternity period (nominally May – August inclusive).
- Prior to works commencing on site, demarcation / a protection zone should be set up around trees retaining bat roosting potential. This should be set up to be approximately 10-15m around the tree.
- Works should avoid blocking suitable potential roosting features within trees highlighted as retaining bat roosting potential. This includes storage of materials and equipment as well as site cabins located away from such features.
- No storage of equipment or materials should be permitted within 10m of any trees highlighted as retaining bat roosting potential.
- Any construction and operational site lighting should be directly away from woodland habitats and all trees highlighted as retaining bat roosting potential. Where appropriate lights should have lighting hoods and cowls to avoid any light spillage. Where required

[8] https://www.iucn.org/resources/issues-briefs/marine-plastics

further information can be obtained from the Bat Conservation Trust / the Institution of Lighting Professionals (accessed online at https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/).

- It is recommended that in the event works are required to operate within 10m of any trees retaining moderate bat roosting potential (e.g. TN6) they are subject to two presence / absence bat surveys during the core active period (nominally March – October inclusive). At least one of these surveys should be undertaken within the bat maternity period (nominally May – August inclusive).
- Trees retaining low bat roosting potential are not required to undergo surveys, however precautionary mitigation should be implemented in the event they are required to be removed.
  - If any trees highlighted as having low bat roosting potential (e.g. TN7, TN8) are required to be felled as part of the development works it is recommended that this is undertaken over the winter period when conditions are such that the trees would not be suitable for roosting bats i.e. during sustained cold winter weather.
  - If this is not possible, and the tree will be removed during the active bat season (nominally April to October) or during particularly mild winter weather, soft felling of the tree is recommended, which will minimise the risk to bats (if present). This will generally comprise the following precautionary elements:
    - The tree should be felled in sections with particular care taken to avoid cutting through suitable bat roosting features.
    - Removed timber will be slowly lowered to the ground and inspected by an ecologist prior to further processing.
    - In the event the features cannot be fully check it should left overnight so that in the unlikely event a bat is present, it can disperse.
    - If at any time a bat is encountered during works to remove the tree, works should stop and an ecologist should be contacted immediately.

4.4.2 Protected and Notable Species: General Mitigation

To avoid negative impacts to other protected and notable species which may occasionally pass through active working zones during the proposed works, the following precautionary mitigation is recommended:

- Given the potential for a number of protected and notable species within the vicinity of the works, a Toolbox Talk detailing the potential for these to occur and what to do in such an instance should be provided to all contractors as part of the induction process. This could be completed by the contractor or if requested, support can be provided by an ecologist.
- Care should be taken during the works for the potential presence of protected and notable species. Working areas should be checked for the presence of protected and/or notable species prior to works commencing each day. This includes a check of lay down areas and below any protection boards at the start of works each day.
- If a protected or notable species is encountered during the works, the following should apply:

  - In the event the following are encountered: otter, badger, pine marten, great crested newt or red squirrel, all works should be suspended, and an ecologist contacted for advice.
  - In the event the following are encountered: common frog, common toad, common lizard, smooth newt, palmate newt, slow worm, all works should be temporarily suspended to allow for the natural dispersal of the species.
  - If there is any ambiguity or concerns with regards to protected and notable species on site, an ecologist should be consulted either before or during the works programme.
- To avoid entrapment or harm to protected and notable species, any excavations should be covered at the end of each day. Where deep excavations occur, a 'mammal' ladder / ramp should be installed to allow any trapped animal a means of escape. Any open pipes should be capped at the end of each shift to prevent possible entry and entombment.
- Effective pollution prevention measures for siltation/hydrocarbons and cement should be in place (especially relating to vehicles and machinery where drip trays should be employed for use under mobile plant) for the duration of the works programme. Any compounds and plant washing facilities (including oils, bottled gas and fuel storage) will be positioned as far away from the watercourses as possible and secured against vandalism.
- Any construction/security lighting (if used) should be directed away from watercourses.

4.4.3 Reptiles and Amphibians

The following recommendations are provided to minimise the potential for impacts to reptiles and amphibians:

- In the event the pile of boulders discussed in Section 3.4.7 and shown in Photograph 10 is required to be removed to facilitate construction of the new WwTW, it is recommended this is undertaken out with the winter / hibernation period.
- Where works are required to operate adjacent to the pile of boulders, it is recommended that demarcation is set up around this feature to prevent accidental encroachment.
- The removal of the boulders should be undertaken sensitively and with consideration for the potential presence of hibernating reptiles or amphibians if removed during the winter or for reptiles' species which may be present if removed during summer months.
- It is recommended that the removal of the boulder pile is conducted under the supervision of an ecologist to allow for pre-works checks and translocation of individual reptiles (if found to be present).
- The boulder pile should be replaced elsewhere within 50-100m of the existing pile to ensure opportunities for reptiles and amphibians persist. The relocated boulder pile would also act as a translocation point in the event any individuals were uncovered during the removal.

4.4.4 Breeding Birds

If possible, vegetation clearance and site preparation works (i.e. top soil stripping of new WwTW site) should be undertaken outside of the nesting bird season (i.e. out with March to August). This will remove any constraints in relation to the potential for nesting birds within the works footprint.

Where proposed works items, access arrangements and any other works activities are likely to result in vegetation clearance and/or access through suitable nesting habitats during the bird breeding season (i.e. March to August, inclusive), the following recommendations are provided:

- If there is uncertainty as to whether nesting birds may be present in ground vegetation and trees/shrubs, it is recommended a nesting bird check is conducted prior to any vegetation removal or tracking of machinery through areas of suitable habitats; and,
- Should an active nest be identified within the footprint or ZoI of the works/access, the nest must be left in place until the eggs have hatched and the chicks have fledged; and,
- All active nests should be zoned off from any nearby work/access areas with demarcation tape and a buffer zone implemented which should be species specific but is general set between 5-10m, to avoid death/destruction of the nest.

4.4.5 Wintering/Migratory Birds

It is recommended the works, particularly those required to be undertaken within or adjacent to suitable wintering/ migratory bird habitat (i.e. construction of the outfall and pipeline within mudflats and saltmarsh) are undertaken outside of the wintering bird season (i.e outside of nominally October to March).

4.4.6 Migratory and Resident Fish

The following recommendations are provided to minimise impacts to migratory and resident fish:

- Where possible it is advised that any works within the estuarine / marine habitats are completed out with the periods of migration for salmonids. This includes avoidance of the upstream migration patterns for adult salmonid (generally May to November), as well as the downstream passage of smolts (generally April to June). Equally this should be timed appropriately to avoid migration periods for lamprey and eels as relevant.
- Each catchment in the UK differs slightly in terms of timing of migration of e.g. salmonids. Where possible, it is recommended that consultation is completed with Marine Scotland, SEPA and the local fisheries trusts (i.e. Galloway Fisheries Trust) for this stretch of the Urr Water, who may offer more accurate information regarding the potential presence and migration patterns of salmonids and other species local to this catchment. .
- Elements of work which are most relevant to the avoidance of periods of fish migration primarily relate to any in-channel works which are required to create a dry working area. In the event dry working areas are required these should be kept as small as practically possible to retain as much of the channel dimensions as possible to maintain free passage for fish.
- Once a suitable damming structure has been installed and the remaining water is to be over- pumped to create a dry working area, the intake of the pump should be screened to prevent fish from being injured. Where appropriate, measures should be implemented for any fish rescue within the confines of dry working area.
- Consideration should be given to slow-start procedures during in-stream works to allow any fish present to disperse naturally from the working areas.

4.5 Enhancements

It is recommended that the replanting of native trees and scrubs is undertaken as part of the project to enhance existing habitats. This would promote suitable habitats for bats, nesting birds and insects. Inclusion of berry-bearing native species such as hawthorn and blackthorn (*Prunus spinosa*) will add diversity to the site as well as providing a suitable forage resource to various species.

It is recommended roosting opportunity within proximity to the works is enhanced by the provision of bat boxes at suitable locations (i.e. on mature trees not retaining existing bat roosting potential).

It is also recommended that suitable herpetofauna refugia is installed on site to enhance the habitat for these species.

Additionally, to support smaller species of birds which utilise the site and surrounding habitats, opportunity remains to install bird nest boxes and/or bird feeding stations at suitable locations.

Appendices

Appendix A. – Phase 1 Habitat Map

Appendix B. – Phase 1 Map Target Notes (TNs)

Appendix C. – Permanent Works Layout

Appendix A. Phase 1 Habitat Map

0 0.5 1 Kilometers

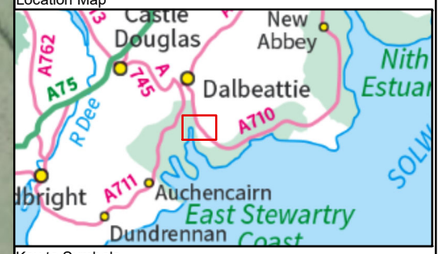
Outfall Location

Existing WwTW

Urr Water

Proposed WwTW

Location Map



Key to Symbols

- Target Note
- New WwTW
- Existing WwTW
- Rising Mains
- Outfall
- Access Track
- Kippford Village
- A1.3.1 Broadleaved Parkland Scattered Trees
- A1.3.2 Mixed Plantation Woodland
- A2.2 Scattered Scrub
- B2.2 Semi-improved Neutral Grassland
- B5 Marsh/marshy grassland
- B6 Poor Semi-improved Grassland
- F1 Swamp
- G2 Running Water
- H1.1 Intertidal - mud/sand - Brown algal beds
- H2.6 Saltmarsh
- J2 Amenity Grassland
- J2.5 Boundary Wall
- J4 Bare Ground

Rev	Date	Drawn	Description	Ch'k'd	App'd
02	28/03/22	KM	Phase 1 Habitat Map	RF	CM
01	03/02/20	KM	Phase 1 Habitat Map	RC	CM

The power of collaboration

Mott MacDonald
St Vincent Plaza
319 St Vincent Street
Glasgow G2 5LD
United Kingdom

Client

Scottish Water

Title

Kippford WwTW and PS
Ecological Constraints Survey
Appendix A
Phase 1 Habitat Map

Designed	RC		Eng Check	RC	
Drawn	KM		Coordination		
GIS Check	RC		Approved	JC	
Scale at A3	Status: FINAL		Rev: P1	Security: STD	

Appendix B. Phase 1 Map – Target Notes

Target note (TN)	Description
TN1	Existing Kippford WwTW. Small building assessed to have moderate suitability in supporting roosting bats. Nesting birds have also been confirmed to use the building during the breeding season. Mature willow-leaved cotoneaster *Cotoneaster salicifolius* tree. Introduced planting may also support nesting birds.
TN2	Proposed site of new WwTW. Nesting bird habitat within areas of scrub and dense juncus along ephemeral watercourse.
TN3	Invasive none-native invasive species Rhododendron with scrub along the southern extent of field boundary.
TN4	Patch of INNS bamboo (*Phyllostachys sp*.) and Rhododendron contained within the garden of a private residence, but a number of bamboo stems were noted to be growing outside of the garden's boundary fence.
TN5	Fresh otter spraint identified in 2020 on rock along shoreline. Gap beneath nearby fence may be used by otter to access field and by-pass culvert.
TN6	Three mature ash trees along boundary wall retaining moderate bat roosting suitability. Mature trees with large cavities potentially suitable to support tawny owl.
TN7	Two mature ash trees along boundary wall retaining low bat roosting suitability.
TN8	Rabbit *Oryctolagus cuniculus* burrows on both sides of stone wall. Several mature trees along southern boundary assessed to have low roosting bat suitability.
TN9	Large area of boulders providing suitable hibernacula for reptiles.
TN10	Nesting bird habitat and rabbit burrows and stone wall. Patch of scrub potentially suitable in supporting nesting birds (March to August)

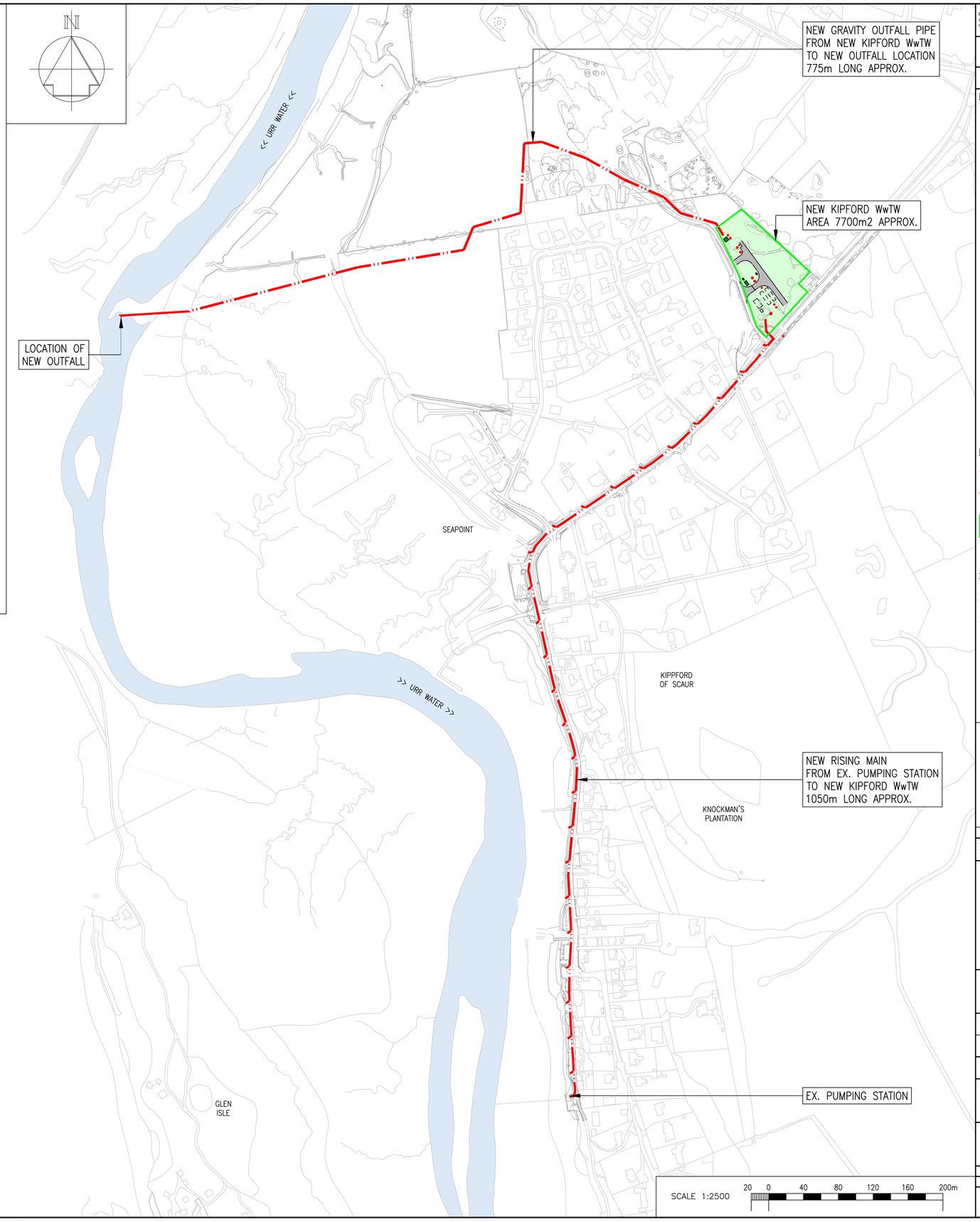
	Rabbit burrows beneath stone wall.
TN11	Small pond within private land.
TN12	Small pond within private land.

Appendix C. Permanent Works Layout

Scottish Water drawing Kippford Sketch Overall Plan

LOCATION PLAN

SCALE 1:25000



SCALE 1:2500 — 20 0 40 80 120 160 200m

CHECK PRINT No: 1

PREPARED BY ..... DATE 26 Mar 2021 - 1:05pm

CHECKED BY ..... DATE .....

Original Size A1

Originator's Drawing No.

Revision

Status S0 Initial Status or WIP

NOTES:
1. ALL DIMENSIONS IN METRES AND ALL LEVELS IN METRES AOD, UNLESS NOTED OTHERWISE.

NEW WORKS LEGEND:
- RISING MAIN – COMBINED (TICK INDICATES FLOW, SIZE AS NOTED)
- GRAVITY OUTFALL
- TREATMENT WORKS

SERVICES LEGEND:
- ELECTRIC – EXTRA HIGH VOLT. (OVERHEAD) TO BE DIVERTED
- ELECTRIC – EXTRA HIGH VOLT. (OVERHEAD) SPEN PROPOSED ROUTE OF DIVERSION

Rev	Description	Drawn	Chk'd	Rev'd	App'd.	Date
0A		---	---	---	---	---

Scottish Water
Trusted to serve Scotland

SCOTTISH WATER
CASTLE HOUSE
6 CASTLE DRIVE
CARNEGIE CAMPUS
DUNFERMLINE
FIFE, KY11 8GG

TEL: 0800 0778778

esd
1 BUCHANAN GATE
BUCHANAN GATE BUSINESS PARK
CUMBERNAULD ROAD
STEPPS, GLASGOW
G33 6FB

Originated By	Drawn By	Checked By	Approved By
MG	CB		
Date	Date	Date	Date
11/03/21	11/02/21		

Scale	Status
1:2500	FOR INFORMATION

Project Title: ROCKCLIFFE BW

Drawing Title: SITE LOCATION KEY PLAN

ELLIPSE EQUIPMENT No.

ELLIPSE PLANT No. | AUTOCODE No.

Drawing No.

Sketch - For Information Only

C:\pw_working\bv_water_pas1192\cbell\d1587500\ 4039510000-ESD-Z0-1800-DR-C-41002.dwg