

# Water Vole Mitigation and Enhancement Strategy

Uskmouth Power Station



ECO01486  
Water Vole Mitigation and  
Enhancement Strategy  
1

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## Quality Management

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## Contents

<b>1</b>	<b>INTRODUCTION</b> .....	<b>1</b>
<b>2</b>	<b>WESTERN BOUNDARY DITCH</b> .....	<b>3</b>
2.1	Ditch habitats .....	3
	Ditch Sections .....	3
	Water Vole Activity .....	4
<b>3</b>	<b>POTENTIAL IMPACTS FROM DEVELOPMENT</b> .....	<b>5</b>
3.1	Habitat Loss and Fragmentation .....	5
3.2	Potential Indirect Impacts.....	5
	Construction Area Working .....	5
	Construction Noise .....	5
	Human Activity .....	8
	Operational Activities .....	8
<b>4</b>	<b>AVOIDANCE AND MITIGATION MEASURES</b> .....	<b>9</b>
4.1	Species and Habitat Protection.....	9
	Construction Exclusion Zone .....	9
4.2	Environmental Working Practice.....	9
	Drainage and Surface Water Management .....	9
	Hazardous Materials .....	9
	Spill Prevention .....	10
	Waste 10	
	Material Storage and Handling .....	10
	Dust Suppression.....	10
	Environmental Monitoring and Emergency Response Plan .....	10
	Contractor Team - Training .....	10
	Suitability for Enhancement .....	11
5.2	Enhancement Methods .....	12
	Ditch Channel Casting .....	12
	Reduce Shading from Scrub Management.....	13
	Marginal Planting .....	13
6.2	Management Actions .....	17
	Periodic Casting .....	17
	Bank Management .....	17
	Scrub Management.....	17
	Invasive Non-native Plant Species .....	17
7.1	Pre-development Monitoring .....	18
	Water Vole Activity Assessment .....	18
7.2	Habitat Enhancement Monitoring.....	18
7.3	Construction Phase Monitoring.....	19
7.4	Operational Phase Monitoring.....	19
<b>8</b>	<b>DELIVERY OF STRATEGY</b> .....	<b>20</b>
8.2	Programme .....	20

## Figures

Figure 1 Ditch Channel Cross Sections

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## Drawings

- Drawing 1 Western Boundary Ditch – Sections Plan
- Drawing 2 Western Boundary Ditch – Ditch Habitat Enhancement Plan
- Drawing 3 Western Boundary Ditch – Ditch Protection Plan

## Appendices

- Appendix A Ditch Section Descriptions
- Appendix B Ditch Section Photographs
- Appendix C Mitigation and Monitoring Programme
- Appendix D Ditch Management Plan

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# 1 INTRODUCTION

## 1.1 Scope of Work

- 1.1.1 This Water Vole Mitigation Strategy has been prepared by RPS for SIMEC Uskmouth Power Ltd (SUP) for the proposed development associated with the conversion of Uskmouth Power Station B (Planning application reference: 20/0748).
- 1.1.2 The proposed conversion of the coal fired power station will require the erection of four silos in the coal stockyard. A ditch channel (referred to as the western boundary ditch) lies beyond the southern perimeter of the coal stockyard.
- 1.1.3 There are low levels of water vole activity in the section of the western boundary ditch adjoining the coal stockyard. Piling required for the construction of silos in the southern half of the coal stockyard has the potential to result in temporary indirect disturbance to individual water voles.
- 1.1.4 All the ditch habitats will be protected from direct disturbance during construction. The strategy sets out the species protection measures and long-term ditch habitat enhancements that will be implemented in advance of and during construction. This report sets out the assessment of habitat quality for water vole; details of the proposed ditch enhancement works in each section; long term management actions; population monitoring and the species protection measures that will be employed for the duration of construction activities in the coal stockyard in the vicinity of the western boundary ditch.
- 1.1.5 The proposed development offers the opportunity to substantially increase the value of the wider western ditch, to provide permanent enhancement of the ditch habitat, supported by ongoing habitat management over the lifetime of the development. Its early implementation will provide alternative habitats for water vole during any short-term disturbance associated with piling during construction.
- 1.1.6 The strategy makes the precautionary assumption of water vole presence in all potentially suitable habitat along the western boundary ditch.

## 1.2 Development Proposal

- 1.2.1 The development proposal comprises the conversion of the coal fired power station, the erection of four silos in the coal stockyard, the installation of a de-dusting building, an extension to rail unloading facility, and the installation of new above ground conveyors. The development proposal is detailed on the Simec Uskmouth Power (SUP) Site Plan (Reference 019784-RPS-SI-ZZ-DR-A-5003).
- 1.2.2 The development includes the construction of four silos, in a north-south orientation, in the centre of the coal stockyard within the central part of the power station landholding. This is currently an area of bare ground that has been subject to high levels of activity during the operation of the coal fired power station.

## 1.3 Legislation

- 1.3.1 The water vole is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is an offence to intentionally or recklessly:
- Capture, kill or injure water voles;
  - Damage, destroy or block access to their places of shelter or protection;
  - Disturb a water vole while occupying a structure or place which it uses for shelter or protection; or,
  - Obstruct access to any structure or place which a water vole uses for shelter or protection.

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1.3.2 The water vole is also a UK Biodiversity Action Plan (BAP) priority species and a Species of Principal Importance for conservation in Wales under Section 7 of the Environment (Wales) Act 2016.

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## 2 WESTERN BOUNDARY DITCH

### 2.1 Ditch habitats

- 2.1.1 The western boundary ditch is over 1km in length running from a culvert beneath the main power station access road at the entrance to the site road and along the southern boundary of the power station adjoining the Newport Wetlands reserve.
- 2.1.2 For the purposes of this study, the western boundary ditch has been subdivided into 11 sections based on the nature of the ditch habitat, as set out in Appendix A. A baseline ditch habitat survey was undertaken along the length of the ditch to identify the opportunities for enhancement of the ditch habitat for water vole.

#### Ditch Sections

- 2.1.3 The extent of each section is illustrated on the Ditch Habitat Plan (Drawing 1) and each section is described in Appendix A providing information on the existing habitats and vegetation, bank substrate, bank profile, and approximate water depth. Photographs of each section are given in Appendix B. A summary is set out below.
- 2.1.4 The eastern end of the ditch (Sections 1-4) is 145m in length, comprising a mix of woody scrub and bramble thicket heavily overshadowing the ditch channel, with a short 25m long section of unshaded channel supporting a dense stand of reed.
- 2.1.5 Section 5 is 136m in length and lies adjacent to the south-eastern boundary of the coal stockyard. It's the only area with an extensive section of unshaded open water with some marginal vegetation, primarily reed. More frequent management of this section in the past has maintained a ditch habitat of higher value for water voles.
- 2.1.6 Section 6, adjoining the south-western boundary of the coal stockyard, nearly 300m in length and dominated by dense reed which grows across the channel with few areas of unvegetated open water. Marginal plant species diversity is very poor with the reed forming a virtual monoculture. The ditch channel in Sections 6 is not safe to access where dense bramble thicket and scrub prevent surveyors from being able to exit the ditch or for assistance to be provided to the surveyor in the event of an emergency.
- 2.1.7 The coal stockyard is bounded to the west by secondary woodland and scrub. Section 7 is a short section of ditch heavily shaded by maturing trees and shrubs on the edge of this woodland. The channel is shallower (<0.5m deep) with a build up of fallen leaves in the base and unvegetated.
- 2.1.8 The northern banks of Sections 5, 6 and 7 are all steep (>45°) and over 2m high with a made ground substrate that is very stony, indicative of the man-made nature of the landform which would have been formed when the power station/coal stockyard was constructed.
- 2.1.9 Section 8 is a shallower ditch channel supporting dense reed and adjoined by grassland and patches of dense bramble. It is 60m long and the current water depth is very shallow above a dense mat of reed roots and as a habitat is currently sub-optimal for water vole.
- 2.1.10 Section 9 is currently largely inaccessible with dense bramble and reed alongside the northern bank. Aerial imagery indicates that the channel is reed dominated, consistent with field observations.
- 2.1.11 A man-made reedbed (1,425m<sup>2</sup>) lies adjacent to Section 9 but is not directly connected to the boundary ditch.
- 2.1.12 Section 10 lies on the edge of a block of secondary broadleaved woodland and the ditch channel is shaded by trees and shrubs with bramble growing across the whole channel in a number of places.

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- 2.1.13 Section 11 at the northern end of the secondary woodland is unshaded with a dense stand of reed in the channel and minimal water depth. This section adjoins an area that is subject to ongoing herbicide treatments to control and eradicate giant hogweed.
- 2.1.14 At the northern end the channel is shallow-sided and heavily shaded by scrub with very low value for water vole. This section has been excluded from the strategy.

### **Water Vole Activity**

- 2.1.15 The majority of water vole activity is associated with Section 5, the only part of the boundary ditch which is unshaded with unvegetated open water over 0.5m deep. Stands of emergent vegetation on the margins (primarily reed) at the base of the bank provide food and cover. This section also has tall herbaceous vegetation on the banks (hemlock water dropwort).
- 2.1.16 The signs of water vole were runs along the northern ditch bank with two piles of fresh feeding piles and a single latrine (<20 droppings). No burrow entrances were found in the reed and tall herb vegetation on the sides of the ditch and much of the bank substrate is stony, limiting the potential for burrowing in this section of ditch.
- 2.1.17 The opposite bank (located within the Newport Wetlands land ownership) has a narrow stand of reed along the base of the bank with a continuous dense bramble thicket growing across the very steep north facing bank.
- 2.1.18 Although dense heavily shading bramble reduces the value of ditch channels due to the level of shade and inhibition of the establishment of marginal plants, where there is low growth of bramble set back from the edge of the ditch it can be a foodplant (leaves and berries) while the thorny structure would give protection from predators.
- 2.1.19 Low levels of water vole activity were also found in Section 6 (some occasional droppings) and Section 8 (very old feeding remains). Both sections currently lack areas of open water and food plants are largely restricted to reed. They are considered to be currently sub-optimal with considerable potential for enhancement through the re-establishment of open water alongside reed and the introduction of additional native marginal plant species.
- 2.1.20 There is currently no access to the ditch channel in Section 9 but again it is assumed that water vole colonies will be present in parts of the ditch and in the adjoining reedbed.
- 2.1.21 The precautionary approach assumes presence (low levels of activity) in Sections 3, 5, 6, 8 and 9, including the off-line reedbed. The levels of water vole activity recorded are consistent with a small population with few droppings, latrines and feeding piles.

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## 3 POTENTIAL IMPACTS FROM DEVELOPMENT

### 3.1 Habitat Loss and Fragmentation

- 3.1.1 No ditch habitats would be temporarily or permanently damaged by the development proposals. The entire western boundary ditch is offset from the working area. There will be no crossings or culverts and no fragmentation of any habitats potentially used by water vole.
- 3.1.2 No new outfalls will be constructed in the ditch bank with the current system of outfall via the reservoir (Lamby Lake) to the east of the coal stockyard being retained.
- 3.1.3 Following the completion of the construction, the existing water vole habitat will maintain the carrying capacity for water vole in the absence of mitigation/enhancement connected to the development.

### 3.2 Potential Indirect Impacts

#### Construction Area Working

- 3.2.1 The construction area for the silos will extend into the southern half of the coal stockyard in the vicinity of the western boundary ditch. Without good environmental practice there is the potential for inadvertent disturbance of ditch habitats and temporary indirect impacts on water quality in the ditch.
- 3.2.2 The boundary ditch is separated from operational coal stockyard by a 5m wide strip of grassland and scattered scrub and by a 7-8m wide engineered drain (referred to as the interceptor channel)
- 3.2.3 The power station construction working area will be set back from the top of the bank of interceptor channel and the minimum buffer between the boundary ditch (top of the bank) and the construction working area will be of 15m.
- 3.2.4 The channel is an operational feature receiving surface water run off from the site and discharging into the reservoir. It is frequently desilted as part of site operations to maintain the water holding capacity and maintain its function in protecting the boundary ditch.
- 3.2.5 This engineered channel is retained on the boundary of the construction working area. During the installation of the silos (and once the site is operational). It will receive any surface water run off, including suspended sediment, from the working area. The channel would also provide protection against any accidental spillages of chemicals within the working area. The channel will continue to function as a key protection for the ditch and the water vole population throughout the construction period.

#### Construction Noise

- 3.2.6 During the construction of the silos in the coal stockyard there is the potential for temporary indirect impacts on water voles from noise generated from the piling required for each of the silos. SUP intends to undertake piling, where required, using a quieter continuous non-impact technique.

#### Piling Locations

- 3.2.7 The four silos will be constructed in series orientated north south. Piling for the southernmost silo will be 20m from the top of the bank of the boundary ditch at the closest point.
- 3.2.8 The piling for the second closest silo will be between 40 and 50m from the ditch and the above ground noise levels will be below 60dB.

3.2.9 The non-impact piling for the three other silos located further from the ditch would result in lower noise levels; located 60m and 100m from the western boundary ditch with no anticipated noise impacts at those distances.

### Timing Restrictions

3.2.10 Unless otherwise agreed with NRW and the LPA, based on the evidence, piling cannot be carried out between July and February (inclusive) because of the perception that noise generated from non-impact piling in the coal stockyard could affect bird behaviour in intertidal habitats in the Severn Estuary Special Protection Area (SPA) over 500m from the noise source. This stringent restriction creates a four month window overlapping with the water vole breeding season and prevent piling during autumn and late winter periods. Currently no distinction is drawn between continuous non-impact piling and the noisier impact piling technique, which can offer a shorter period when piling takes place but is usually considered more likely to affect birds (startle effect).

3.2.11 Due to the timing restrictions the southernmost silo closest to the western boundary ditch would be timed to occur over a six week period running from the start of March and mid April in the year it is completed. The piling for the second silo would follow on being completed between mid April and June the same year.

3.2.12 Piling for the northern two silos would be delayed for eight months until March to June the following year.

### Noise Levels

3.2.13 Research into the features and parameters of the outer, middle, and inner ear of water voles (Journal of Morphology 262:770–779, 2004) found that as a species they are best tuned to frequencies of about 8–16 kHz with a high-frequency cut-off at about 50–60 kHz. It was also found that the sensitivity to noise was intermediate, but as would be expected, more sensitive than house mice living in often noisy residential houses.

3.2.14 Noise modelling for the southernmost silo, based on auger piling method, indicates that approximately 260m of ditch channel would be subject to moderate noise levels during piling (note that augured piling is a relatively steady noise). The majority of this stretch would be between 55dB and 60dB (60dB is equivalent to normal conversation or a moderate wind in trees). A short section of ditch, 65m, would be subject to noise levels between 60dB and 65dB (a shower or rainfall is equivalent to 70dB).

**Table 3.1 Review of Noise Effects**

Ditch Section	Precautionary Water Vole Status	Maximum Piling Above Ground Noise Levels	Potential for noise impact	Anticipated effect on water vole
1	Likely absence	55dB	No	None
2	Likely absence	55dB	No	None
3	Potentially present	60dB	Possible	Low likelihood of temporary displacement
4	Likely absence	60dB	Possible	None
5	Confirmed presence	55–60db – 75m 60-65dB – 50m	Possible	Potential temporary displacement during non-impact piling for the southernmost silo
6	Presumed presence	45–50dB – 90m 50–55dB – 60m 55–60dB – 75m 60-65dB – 60m	Possible	Potential temporary displacement from eastern half of the ditch during

				non-impact piling for the southernmost silo
7	Likely absence	45-50dB	No	None
8	Presumed presence	45-50dB	No	None
9	Presumed presence	40-45dB	No	None
Reedbed	Presumed presence	40-45dB	No	None
10	Likely absence	35-45dB	No	None
11	Likely absence	35-4065	No	None

### Substrate Limitations

- 3.2.15 The northern bank of Sections 5, 6 and 7 are all sub-optimal for the formation of burrows. None have been found but a couple of short, dead-ended holes were noted. Each had a diameter typical of water vole burrow entrance and are most likely to be failed attempts to establish burrows.
- 3.2.16 The signs of water vole activity in the eastern section of Section 5 and with the limited potential for burrow creation strongly suggests that most will be in the southern ditch bank which is obscured by overhanging bramble thicket and reed.
- 3.2.17 In comparison, the upstream (Sections 1-4) and downstream (Sections 8-11) parts of the western boundary ditch have soil substrate banks and would be suitable for burrowing but are currently sub-optimal due to shading and/or a lack of open water.

### Predicted Effects

- 3.2.18 In total, 260m of Sections 5 and 6 would be subject to above ground noise (higher than 55dB) over a six week period in early spring. It is possible that indirect noise and vibration associated with piling of the southernmost silo could result in a high enough level of disturbance for individual water voles to temporarily disperse from Section 5 and the eastern part of Section 6.
- 3.2.19 However this worst case outcome is considered unlikely for the following reasons.
- Noise levels below ground in burrows will be at least 15dB lower than the modelled above ground levels.
  - Water voles are highly territorial and exhibit high fidelity to breeding territories. Where the level of impact from noise is minor the breeding females could be expected to remain in burrows in the ditch during piling.
  - The water vole colony is located in close proximity to the operational coal stockyard and populations are known to habituate to urban and even noisier environments, with known colonies adjacent to busy trunk roads and motorways, with much higher decibel levels.
  - The number of burrows in the northern banks of Sections 5 and 6 is likely to be limited because of the substrate which is very stony made ground which would have been constructed when the power station and coal stockyard were originally built.
- 3.2.20 Any adverse impact on the populations would be minor and temporary, limited to a six week period that would commence before the start of the breeding season (March). At this time females will be more mobile and actively establishing territories for the spring and summer breeding season.
- 3.2.21 There will be no adverse change to the value or suitability of Ditch Section 5. The habitat suitability would return as soon as the piling was concluded. Recolonisation by individuals, assuming any dispersal, should occur before the start of the breeding season the following year (March).
- 3.2.22 There would no effect on water vole behaviour beyond the single breeding season. The precautionary approach being adopted is based on the temporary dispersal movement of a small number of water voles from Section 5 and the eastern part of Section 6.

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- 3.2.23 Enhancement of the ditch channels for water vole in Section 2, the western part of Section 6 and Section 8 will provide better habitat for water vole, increase the availability of food and encourage the establishment of additional / expanded colonies in sections of the boundary ditch that are currently sub-optimal.

### Human Activity

- 3.2.24 Construction will also result in a temporary increase in human activity in the coal stockyard when the silos are being installed along with the associated hardstanding. When considered in the context of the operational use of this area of the site, any colony present in this location will be habituated to the regular movement of people and the trafficking and noise of vehicles. Many water vole colonies are known to thrive in urban environments where individuals will not be particularly sensitive to human activity within these locations.
- 3.2.25 Following a precautionary approach based on noise modelling it is considered that there is a potential for impact on water vole, diminishing with distance within 120m of the piling location. The levels of disturbance likely to result in disturbance and requiring mitigation will be refined in the detailed design stage following confirmation of the works specifications and duration.

### Operational Activities

- 3.2.26 During the operational life of the power station, the entire western boundary ditch will fall within a dark corridor. Any lighting around the silos will be set back from the ditch by at least 15m and will be directional to avoid the potential for any light spill onto the ditch channel or banks.
- 3.2.27 Once the development is complete and the silos are operational the engineered channel will continue to define the edge of the operational area and be part of the buffer zone between the development and boundary ditch.
- 3.2.28 A permanent 10m stand off will be maintained from the ditch channel with no activities associated with the operation of the silos permitted within that zone. The levels of human activity around the silos will be typically be limited to maintenance and security checks. By its nature, the use and control of the site will prevent other potential activity that could be more harmful.
- 3.2.29 The interceptor channel will be subject to periodic desilting to maintain its protective function for the boundary ditch.
- 3.2.30 Access into the 10m buffer zone alongside the ditch will be restricted to security walkovers, habitat and species monitoring and infrequent ditch management operations. There will be no indirect disturbance effect on the population from the operation of the silos or site boundary security checks.
- 3.2.31 During the operational stage, the ongoing management of the ditches to maintain their value as a habitat for water voles and wider biodiversity will follow timings and methods designed to protect burrows and individuals and minimise any temporary disturbance associated with casting of silts and management of bankside vegetation (as detailed in Section 6 of this report). The proposed management will promote the conservation status of the water vole population in the boundary ditch and has the potential to deliver a significant long term positive effect, at the local level.

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## 4 AVOIDANCE AND MITIGATION MEASURES

### 4.1 Species and Habitat Protection

- 4.1.1 The ditch habitat will be protected from accidental damage during construction through a 15m stand off / buffer zone. The implementation of good environmental practice throughout the construction activities in the vicinity of the ditch would control the use and storage of chemicals to design out potential for indirect pollution.

#### Construction Exclusion Zone

- 4.1.2 The 15m buffer zone will be a construction exclusion zone with no construction works. Access will be authorised activities associated with the ditch channel including monitoring of the ditch and water vole population, the implementation of habitat enhancement and ditch management activities.
- 4.1.3 A Heras fence (or equivalent) will be installed on the boundary of the working area prior to the start of construction and will be subject to regular maintenance checks.
- 4.1.4 The buffer zone will comprise an existing engineered channel (referred to as the interceptor channel) and a strip of rough grassland, tall herb, scattered scrub and bramble with a minimum width of 5m. The Heras fence will be offset from the top of the bank of the interceptor channel by 2m. There will be clear separation between the boundary ditch and the operational coal stockyard.
- 4.1.5 The alignment of the Heras fence, extent of contractor exclusion area and areas within the working area are illustrated on Ditch Protection Plan (Reference ECO01486-001).
- 4.1.6 There will be no materials storage areas within the contractor exclusion zone and storage will be avoided next to the Heras fence. Soils stockpiles and chemical storage areas will be a minimum of 30m from the boundary ditch and separated from it by the interceptor channel.

### 4.2 Environmental Working Practice

- 4.2.1 Environmental protection measures during construction will be specified in method statements which will be produced by the contractor in accordance with the relevant British standards. These will include relevant measures for dust control, prevention of spills, safe handling, storage and transport of materials, safe waste storage and disposal, drainage strategy, prevention of discharge to surface or ground water, and noise control. The method statements would be maintained in the site office at all times and referred to for any aspect of works which could result in environmental impacts.

#### Drainage and Surface Water Management

- 4.2.2 Best practice measures on materials storage handling, movement and spill prevention will be followed. A drainage strategy for the construction site will be prepared to comply with water drainage and pollution prevention legislation.
- 4.2.3 The interceptor channel is an operational feature that will receive any surface water run off from the construction area. This feature has successfully protected the boundary ditch over the lifetime of the coal stockyard. It will function throughout the construction period and will be subject to periodic desilting to maintain its water holding capacity and protection function.

#### Hazardous Materials

- 4.2.4 Hazardous materials will be stored according to COSHH Regulations in a signed, safe and secure facility which will be regularly monitored for spills or damage. A register of hazardous materials on site will be maintained.

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## Spill Prevention

- 4.2.5 Fuel stored on site will be tanked / banded with the tank / bund regularly inspected for damage and leaks. Any surface / water or contaminated water collected in bunds will be removed using controlled positive lift pumps and disposed of appropriately. Spill response kits will be provided, and personnel trained in their use. A trained person will be available on site at all times when construction activity is ongoing.

## Waste

- 4.2.6 Lockable site waste disposal compound with bunds / interceptors will be used. Only appropriately licensed skip suppliers and waste carriers will be used. Skips will have lids where needed. Litter bins will be provided in designated areas. All litter will be placed only in the bins provided.

## Material Storage and Handling

- 4.2.7 Material deliveries will be supervised by an individual familiar with all procedures and restrictions on site. Stockpiled materials will be sited over 20m from surface water features and over 30m from the western boundary ditch. Only designated areas will be used for handling and storage of construction materials.
- 4.2.8 Stockpiles of soils and construction materials will be kept to a minimum practicable height and compacted if necessary. Storage time of materials on site will be minimised as far as possible.

## Dust Suppression

- 4.2.9 Dust suppression will be employed for activities with the potential to result in dust deposition on boundary vegetation. All dust generating materials transported to and from site will be covered. Stockpiles of soil will be covered or damped down where necessary. Bare dry soil generating dust will also be damped down.

## Environmental Monitoring and Emergency Response Plan

- 4.2.10 All control measures will be regularly monitored to ensure they are functioning as intended. A log of environmental monitoring will be kept and maintained on site. An emergency response plan will be prepared to define actions to address any incidents of pollution or environmental damage. The plan will include named parties responsible for overall environmental protection as well as monitoring and maintaining the monitoring log.

## Contractor Team - Training

- 4.2.11 Toolbox talks and induction / training will be provided for all site staff on the general environmental protection measures, and any relevant specific task related measures. The talk will include information on legally protected species including the presence of water vole in the ditch, their legal protection, and the responsibilities of the contractor team as individuals and as a whole to avoid works being unlawful.
- 4.2.12 Prior to habitat enhancement works, a toolbox talk will be given by a suitably experienced ecologist to provide additional information on water vole habitat, the signs of activity and a detailed breakdown of relevant precautionary working methods.
- 4.2.13 A specific method statement will be prepared for the casting of the ditch channel and the planting of marginal species during enhancement works. The precautionary working methods will be supervised by an Ecological Clerk of Works and their implementation documented and photographed.

## 5 DITCH HABITAT ENHANCEMENT

### 5.1 Habitat Enhancement Proposals

5.1.1 Based on the current status of the ditch habitats areas enhancements will be targeted at Sections 3, 6, and 8. The ditch channels are dominated by reed which typically grows across the ditch with minimal unvegetated open water. Shading of the channel will be reduced where appropriate. Access on foot would be reinstated along the currently inaccessible Section 9 to facilitate a review of future options for management within the ditch management plan. The enhancement proposals are summarised in Table 5.1 and detailed below.

**Table 5-1 – Summary of Ditch Enhancement Proposals 2021**

Field Ditch	Current Ditch Habitat	Casting	Reduce Shading (woody species)	Marginal Planting	Bankside mowing / cutting (tall herb, bramble and reed)
1	Bramble covered ditch channel				
2	Heavily shaded ditch channel with open water		Y		Y
3	Dense stand of reed	Y		Plug planting locally native plants and seeding	Y
4	Heavily shaded ditch channel with open water		Y		Y
5	Open water ditch			Plug planting	
6	Dense stand of reed	Y		Coir rolls	Y
7	Heavily shaded open water				
8	Dense stand of reed	Y		Plug planting and seeding	Y
9	Reed/open water?				Y
9 (Reedbed)	Reedbed				Y
10	Wooded ditch with heavily shaded open water with bramble areas		Y		Y (localised)
11	Dense stand of reed				

### Suitability for Enhancement

#### Section 6

5.1.2 Section 6 of the ditch has established mature vegetation (reed) providing cover and food source, a ditch profile equivalent to Section 5 but lacking the open water habitat.

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- 5.1.3 The existing water depth is approximately 0.5m which would be deepened to over 0.5m from the casting of silts and removal of part of the mass of reed root. The banks on either side are stable (c2m above the channel) and will not be subject to flooding in winter.

## Section 8

- 5.1.4 Section 8 also has a dense established stand of reed. The current water depth is shallow (under 20cm) but this would be deepened to 0.5m following casting.
- 5.1.5 The northern bank has soil substrate and is approximately 1m above the water level in the channel with a shallower 30° gradient. The southern bank is bramble thicket and the ground rises 3-4m above the channel. A small amount of old feeding remains were found indicating that currently this section has low levels of use by water vole.

## Section 5

- 5.1.6 Section 5 has deep open water fringed by reed dominated marginal vegetation and tall herb (hemlock water dropwort) and its higher level of habitat suitability for water vole is reflected in the signs of activity recorded. The seeding and planting of marginal plant species will increase the variety of food plants and increase cover at the base of the bank.

## Section 3

- 5.1.7 This short section is dense reed with mature scrub shading the channel at either end. The banks are soil with good potential for burrowing. Casting would create a better balance of open water and reed and reducing the level of shade in Section 4 will create a better connection to the main area of water vole activity at the eastern end of Section 5.
- 5.1.8 All the sections of the boundary ditch are generally undisturbed with site personnel occasionally walking along the bank of Sections 3, 5, 6 and 8 during site inspections and security checks.
- 5.1.9 All four sections are considered suitable for enhancement for water voles. None of the banks with presumed presence in each section will be reprofiled. Long reach machinery will be used to avoid any physical disturbance of the banks.

## 5.2 Enhancement Methods

### Ditch Channel Casting

- 5.2.1 Casting will remove the accumulated silts and vegetation and reed root mass from above the base of the channel with a long reach excavator. In each section the ditch channel will be cast to increase the extent of open water in sections that will be managed as a pioneer successional stage ditch habitat with the aim of establishing and maintaining a wider diversity of aquatic plants.
- 5.2.2 The stands of reed growing along the southern bank will be retained as a fringe of marginal vegetation. The open water channel will be approximately 2m wide and will create an almost continuous 500m long channel of open water from Section 5 to Section 8.
- 5.2.3 The re-establishment of open water in areas that are currently a reed monoculture coupled with the cutting back of bramble overhanging the far bank will promote the diversity of aquatic flora and fauna and create spaces for a wider range of water vole food plants through supplementary planting and natural colonisation.
- 5.2.4 Bramble thicket at the base of the southern bank will also be cut back using long arm flail where the bramble significantly overhangs the water. This will create less shaded bare ground at the base of the bank and encourage the colonisation and growing of aquatic plant species in locations where they are currently absent.

- 
- 5.2.5 Disturbance of the existing ditch banks will be avoided to protect features in which burrows could be located. All existing ledges/narrow berms at the base of the bank, above or below water level, will be left undisturbed during casting to retain these features.
  - 5.2.6 The cast silts and vegetation will be placed alongside the ditch channel (beyond the top of the banks and left for between 1 and 2 weeks to allow for the material to sufficiently dry out in order for it to be handled and composted (on-site or off-site)
  - 5.2.7 The proposal will create continuous open water between Section 5 and 9, improving the hydrological movement within the system.

## **Reduce Shading from Scrub Management**

- 5.2.8 Selected shrubs and bramble on the northern bank that currently significantly shade the channel in Section 6 and 5 will be cut back to ground level using hand tools including all sea buckthorn.
- 5.2.9 Where required for the casting management; reed, tall herb, and bramble would be cut back in advance, increasing visibility of the bank and channel, outside of the breeding bird season. Areas of bramble thicket that are set back from the ditch channel will be retained as valuable cover for wildlife, wherever possible.
- 5.2.10 Localised areas of dense shaded channel in Sections 2 and 3, 40m in total, would be subject to the reduction in the canopy to increase light levels in the ditch and encourage the establishment of marginal plants.
- 5.2.11 A short 30m section of the ditch adjoins secondary woodland (Section 7). This section will be left undisturbed. The ditch channel has shallow unvegetated open water connecting the dense reed in Section 6 and Section 8.
- 5.2.12 Section 10 has a wooded context and is shaded. Areas of dense bramble thicket growing over the ditch channel will be cut back. Shrubs growing on the sides of the ditch bank will be cut back/coppiced.

## **Marginal Planting**

- 5.2.13 A combination of seeding the base of the bank, plug planting into the edge of the ditch channel and pre-planted coir rolls will be used following casting to introduce common locally native plant species that occur in ditches in the local area to diversify the range of species which would be food plants for water vole.
- 5.2.14 Pre-planted coir rolls (3mx0.3m) will be used in Section 6 where the stony ground at the base of the bank will limit locations where marginal species could be planted directly into soil. The rolls will be securely held in place by willow stakes with the top of the coir roll 10 to 20cm below water level.
- 5.2.15 It is anticipated that soil will collect behind the coir roll at the base of the bank to create a narrow ledge. Over time the coir roll will naturally degrade leaving the stand of mixed marginal vegetation.
- 5.2.16 In sections where the banks are less stony marginal plants would be introduced in groups of plug plants supplemented with seeding into the base of the bank. Options for transplanting of target species from local sources would be adopted as a replacement to plug plants if available.
- 5.2.17 Plugs would be planted directly into soil just above water level in late spring when establishment should be most rapid. Seeds would be sown into soils in April and would provide cover in the following year. Seeding areas will be 10-20cm above water level and the surface of the ground would be lightly broken up using hand tools immediately before sowing. Seed would be hand sown in a 10-20cm wide strip at the rate of 3g per 5m length, the seeding areas being lightly pressed to maximise the contact between seeds and soil into the ground.

**Table 5.2 Planting Specifications**

Section	Plug planting	Coir rolls	Channel margin seeding
Section 3	Four 1m long planting areas 20 plants		50% of ditch channel margin Length - 12m Quantity – 4g
Section 5	Four 1m long planting areas 16 plants		20% of channel margin Length - 27m Quantity - 10g
Section 6 (east and central)		Ten 3m long pre planted coir rolls in installed in pairs 40m apart	
Section 8	Eight 2m long planting areas 80 plants		40% of channel margin Length - 24m Quantity - 8g

**Table 5.3 Marginal Planting Species Mixes**

Common Name	Scientific Name	Marginal Plants			Aquatic Plants
		Plug planting % by number	Coir rolls % by number	Seeding % by weight	Plug Planting % by number
Yellow flag,	<i>Iris pseudocorus</i>		20	30	
Wild angelica	<i>Angelica sylvestris</i>			10	
Gipsywort	<i>Lycopus europaeus</i>			5	
Figwort	<i>Scrophularia nodosa</i>			2	
Ragged robin	<i>Lychnis flos-cuculi</i>			6	
Meadowsweet	<i>Filipendula ulmaria</i>			20	
Soft rush,	<i>Juncus effusus</i>	30	20	10	
Lesser pond sedge,	<i>Carex acutiformis</i>	40	20	12	
Purple loosestrife	<i>Lythrum salicaria</i>		20	5	
Reed canary-grass	<i>Phalaris arundinacea</i>		20		
Fools water-cress	<i>Apium nodiflorum</i>	20			
Branched bur-reed	<i>Sparganium erectum</i>	5			
Hornwort	<i>Ceratophyllum demersum</i>				100
		sown at 3g/ square metre			2 plants per 50m of open water ditch

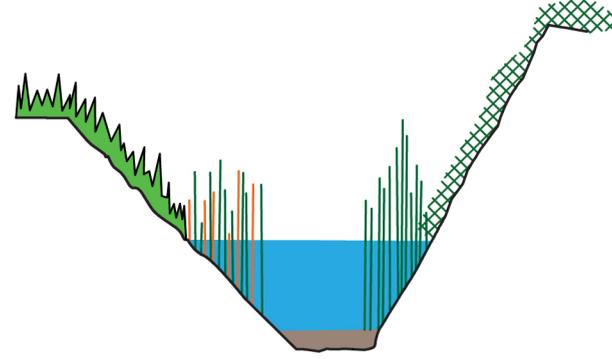
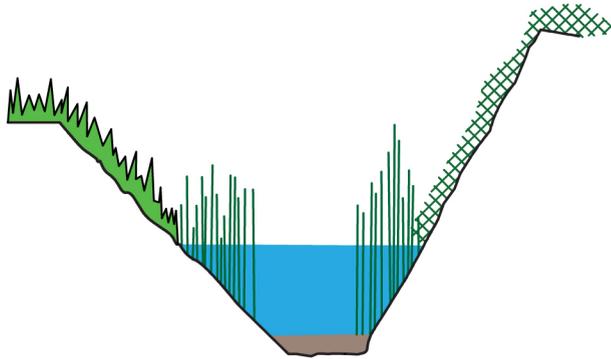
- 5.2.18 Indicative cross sections of the existing ditch profile and the habitats to be established through enhancement and long term targeted management are shown on Figure 1. These show the approximate bank heights and gradients, and estimated depths of open water and silt.
- 5.2.19 The casting and planting would be completed over 12 months prior to piling in the coal stockyard with one full growing season for the planted material to establish.
- 5.2.20 The monitoring of habitat enhancements and water vole activity will cover before and after the proposed enhancement of the ditch habitat, during piling and construction in the coal stockyard and once the development has completed and operational.
- 5.2.21 The anticipated programme of works is summarised in Table 5-4 and tabulated in Appendix C.

Existing

Post enhancement

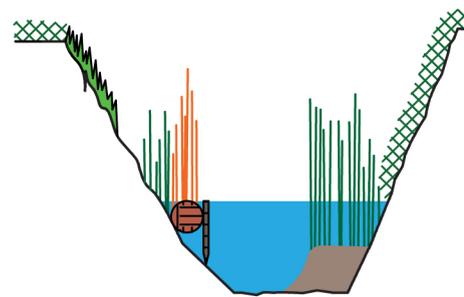
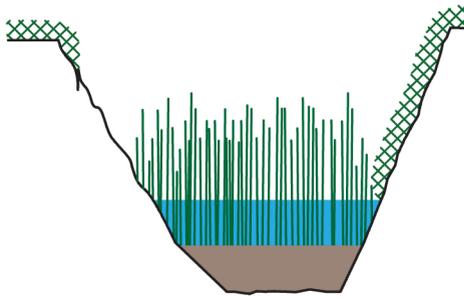
Legend

Cross-section 5

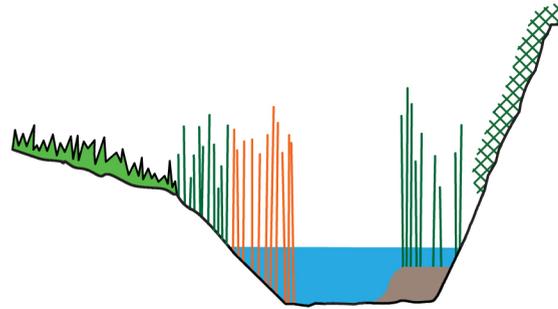
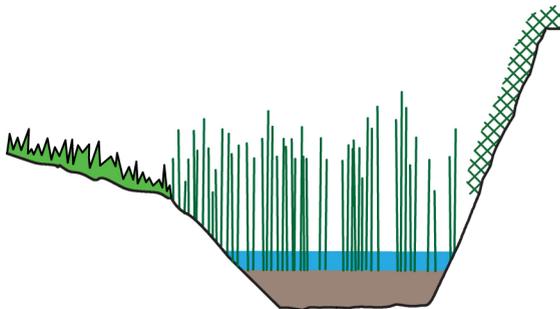


-  Water level
-  River bed silt
-  Bramble
-  Reeds
-  Proposed marginal planting
-  Tall herbs / grass
-  Coir roll with willow stake

Cross-section 6



Cross-section 8



**Table 5-4 – Programme for Ditch Enhancement**

Action	Timing
<b><i>Water Vole Enhancement</i></b>	
Water vole colony mapping	April and late August 2021
Advanced vegetation cutting back prior to casting	September 2021
Cast Sections 2, 6, and 8	mid September 2021
Removal of arisings	Late September 2021
Marginal plant seeding	October 2021
Plug planting	October 2021
Installation of coir rolls	October 2021
Cutting track through bramble and reed alongside Section 9 <i>Review ditch habitat condition for future management and potential enhancement</i>	October 2021
Provisional - supplementary marginal planting	May 2022
<b><i>Piling Operations in coal stockyard (provisional earliest potential dates)</i></b>	
Piling for southernmost silo	March to April 2023
Piling adjoining silo	April to June 2023
Piling for two northern silos	March to June 2024

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## 6 HABITAT MANAGEMENT

### 6.1 Overview

- 6.1.1 Long term management of the western boundary ditch would be brought forward to promote the ecological value of 500m section of boundary ditch on the perimeter of the power station landholding with the emphasis on maintaining and improving the conservation status of the water vole population.
- 6.1.2 The aim would be to maintain largely unshaded channel with open water and fringes of marginal vegetation.
- 6.1.3 Key management objectives
- Management of reed to maintain open water and increase marginal plant species diversity and abundance
  - Control of bankside scrub to prevent significant overshadowing
  - Periodic cutting back of bramble from encroaching into the channel from the southern bank (subject to agreement from NRW/RSPB)
  - Establish mixed species herbaceous vegetation on the significant lengths of the northern ditch bank
  - Ongoing control of invasive non-native plant species with the goal of eradication from the western boundary ditch
- 6.1.4 A rolling management of cutting back bankside vegetation, periodic casting of the ditch channel and scrub management to reduce and maintain lower levels of shading in sections of ditch of higher value for water voles. These measures should reduce the extent of late succession (reed) habitat and increase opportunities promoting an increased diversity of self-sustaining populations marginal and submerged aquatic plant species.
- 6.1.5 The management actions, timing and frequency are defined in the ditch habitat management table in Appendix D.
- 6.1.6 Other factors that will influence management decisions include:
- Trespass from the Newport Wetlands and theft,
  - Security and site boundary maintenance,
  - Invasive non-native plants,
  - Water holding capacity of the boundary ditch,
  - Other legally protected species – primarily nesting birds, otter, bats – and wildlife legislation
- 6.1.7 Bankside management would be outside of the nesting bird season. Any active nests must remain undisturbed until the young have fully fledged birds and the adults have abandoned.
- 6.1.8 Cetti's warbler, a species protected under Schedule 1 of the Wildlife and Countryside Act 1981), is widely distributed in suitable reed/scrub habitats in the local area. This species is legally protected from disturbance as well as damage to the nest sites. This species nests at the base of stands of reed or in dense scrub and the site has the potential to support breeding pairs. Any Cetti's warbler nest sites will be protected within an exclusion area with no management of ditch vegetation in a 30m zone on either side of the nest.

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## 6.2 Management Actions

### Periodic Casting

- 6.2.1 Following the initial enhancement of the ditch and casting of specific sections, the rate of reed recolonisation and spread will be monitored. It is anticipated that following casting of the ditch channels, the recolonisation by common reed could be relatively rapid within Sections 3, 6 and 8. Therefore a rotational programme of casting will be carried out to maintain a balance between dense reed and open water channels and also maintain the water holding capacity and hydrological movement within the ditch.
- 6.2.2 It is envisaged that each open section of the ditch channel will be cast once every 4 to 6 years. Casting would be rotational so that no more than 30% of the open sections of the boundary ditch would be cast in any one year. Casting method would follow the procedure set out in Section 5.3.

### Bank Management

- 6.2.3 Tall herb and grassland on the ditch banks will be cut to 100mm above ground level annually in autumn (September). Dense stands of reed on the sides of the channel should be cut as part of the annual management of the banks. All arisings will be removed and vegetation that falls into the ditch would be removed using a mechanical rake (or equivalent). The rake would also be used to remove any dense mats of dead vegetation on the bank. The cutting equipment and method will specifically avoid creating tiny fragments of vegetation that cannot be easily be removed.

### Scrub Management

- 6.2.4 Areas of maturing scattered shrubs growing on the ditch bank and/or overhanging the ditch channel will cut back to ground level. Sea buckthorn will be systematically cut back where it is present on the ditch bank.
- 6.2.5 Shrubs to be felled would be identified during the habitat monitoring visits in late summer and would be removed using hand-held tools over the winter months. A full review of scrub regeneration and removal of maturing regrowth would be undertaken once every three years.
- 6.2.6 The localised areas of dense bramble thicket completely growing over the ditch channel would be cut back to ground level and subsequently regularly managed to prevent encroachment onto the lower bank.
- 6.2.7 Where practical, areas of dense bramble on the southern bank that significantly overhang and shade the open water will be cut back from the northern bank.

### Invasive Non-native Plant Species

- 6.2.8 Management of invasive non-native plant species is ongoing to prevent the spread of plants and reduce their distribution, with the goal of eradication over time.
- 6.2.9 Giant hogweed is occasional to the south of Section 11 and all growth stages are subject to a programme of herbicide treatment each year as part of a site wide control programme. One plant of giant hogweed in Section 8 has also been subject to herbicide applications in 2020.
- 6.2.10 Japanese knotweed is virtually absent from the boundary ditch with a few isolated plants growing on the southern bank of Section 5 within the Newport Wetlands indicating relatively recent colonisation. Herbicide treatment of the Japanese knotweed plants will be included in the management of the ditch to prevent further spread from plant fragments, where this can be safely undertaken without adversely affecting the ditch habitats or vegetation

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## 7 MONITORING

### 7.1 Pre-development Monitoring

#### Water Vole Activity Assessment

- 7.1.1 The baseline population assessment would be carried out in 2021 with survey visits (mid-April and June) and a second between July and September.
- 7.1.2 Each survey would comprise a metre by metre search from the bank, and where possible and safe, from within the ditch channel. Areas where views of the bank are obscured and access into the channel is restricted/unsafe will be mapped along with any other limitations.
- 7.1.3 A count will be made of water vole latrines within each section of the boundary ditch. Other field signs will be noted with a focus on water vole burrows and feeding signs.
- 7.1.4 The survey will be undertaken during a period of dry weather when field signs would not have been washed away by rain in advance of the survey.
- 7.1.5 The survey will define the relative density of water vole activity based on the level of activity and habitat quality and any constraints that could result in under recording. The future periodic monitoring of water vole activity would follow the same method.

### 7.2 Habitat Enhancement Monitoring

- 7.2.1 The key aim of the proposed enhancement of the habitats in the western boundary ditch is to increase the suitability of sections of ditch that are currently sub-optimal for water vole populations.
- 7.2.2 They will need to provide suitable alternative habitat prior to the start of piling and construction activities in the coal stockyard.
- 7.2.3 Following the implementation of the habitat creation proposals the outcomes would be subject to review over the subsequent growing season. The assessment will record establishment and spread of planted bankside vegetation along sections 5, 6 and 8.
- 7.2.4 The broad target will be the creation of frequent new areas where the food plants of water vole are establishing on the margin of a channel with at least 50% open water. The ditch channels should have sufficient open water for water vole to easily disperse and forage with sufficient water depth for the voles to be able to dive into at the base of the ditch.
- 7.2.5 The planting and seeding will be undertaken in October after the casting of the ditch. Ditch habitat monitoring would be undertaken in April, June and late August the following year to record the habitats as they establish. Monitoring will record the establishment of plants (plugs and coir rolls) and the germination of species seeded into the base of the bank.
- 7.2.6 The retention of reed on the southern margin of the ditch in each section subject to enhancement will ensure an important source of food is maintained as well as cover from predators.
- 7.2.7 The monitoring would determine if there have been any locations where the marginal plant seeding and plug planting has failed. The remedial actions would be supplementary plug planting of target species during April and May 2022.
- 7.2.8 Signs of water vole activity would be noted and mapped in 2021 and updated prior to casting in September 2021, and during the habitat monitoring visits in spring and summer 2022.
- 7.2.9 The habitat will be available for the full duration of construction activities and will ultimately provide enhancement for water vole over the operational life of the development, through low intensive cutting management and periodic casting which will channel to control the dominance of reed and promote the growth of varied foodplants with significant areas of unvegetated open water.

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## 7.3 Construction Phase Monitoring

- 7.3.1 Water vole monitoring would run concurrently with construction/piling and continue into the post-construction period to assess the use in the section subject to temporary disturbance and the enhanced habitats.
- 7.3.2 Surveys of water vole activity would be completed in late February, one week prior to the initiation of piling for the southernmost silo. Water vole activity in Sections 2, 5, 6, and 8 will be recorded monthly during piling operations in the southern half of the coal stockyard.
- 7.3.3 The survey would be repeated in late August / early September, six months after the completion of piling for the southernmost silo and in April the following year 12 months after.
- 7.3.4 The findings of each round of monitoring will be written up as a brief report and submitted to Newport City Council and NRW.

## 7.4 Operational Phase Monitoring

- 7.4.1 During the first 9 years of operations, water vole activity would be monitored once every 3 years with the goal of assessing the levels of water vole activity along the length of the boundary ditch and reviewing the outcomes of the habitat management.
- 7.4.2 The monitoring surveys would be carried out in either May or September and would record and map signs of use by water voles in the ditch adjoining the development and in the section of enhanced ditch channel. Monitoring would record burrows, latrines, feeding piles and runs and would provide an overall assessment of levels of use in each section.
- 7.4.3 The outcomes of ongoing habitat management would be assessed and documented. If additional actions are required to meet the conservation objective for the water vole population (or other species) then modifications to the management plan will be proposed through consultation with the Newport City Council ecologist.

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## 8 DELIVERY OF STRATEGY

- 8.1.1 The delivery of the strategy is fully in the control of SUP. Although the ditch lies on an ownership boundary the north side of the channel and north bank fall entirely within the power station ownership boundary. This ensures full accessibility for both the initial enhancement works and ongoing management including access routes for contractors and machinery.
- 8.1.2 Enhancement, monitoring and ongoing ditch management and monitoring would be fully funded by SUP.
- 8.1.3 The findings and outcomes of monitoring and management would be documented with copies provided to NCC.
- 8.1.4 Enhancement would be implemented in advance of development and subject to compliance checks. The delivery of improvements to currently sub-optimal habitat with direct connectivity to the colony will lead to a permanent improvement in the extent of suitable habitat, providing an overall gain for water vole habitat over the operational life of the development.

### 8.2 Programme

- 8.2.1 A detailed delivery programme for survey, enhancement and construction is presented in Appendix B. The enhancement of the western section of the boundary ditch would be carried out over 12 months prior to the start of any construction activities in the southern half of the coal stockyard, followed by monitoring in the growing season to assess the quality of the modified ditch habitats.
- 8.2.2 Protection measures for the section of the boundary ditch adjoining the coal stockyard will be installed prior to any enabling works or development activities within the coal stockyard and would remain in place until the completion of the construction of the silos and associated terrestrial habitat creation.
- 8.2.3 Water vole population monitoring would be carried out each year during construction and the first year following construction of the silos. Follow up surveys will be carried out every three years over the following 10 year period to assess longer term effects of habitat enhancement and the management of the ditch for biodiversity.

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## Drawings

**Drawing 1** Ditch Section Plan

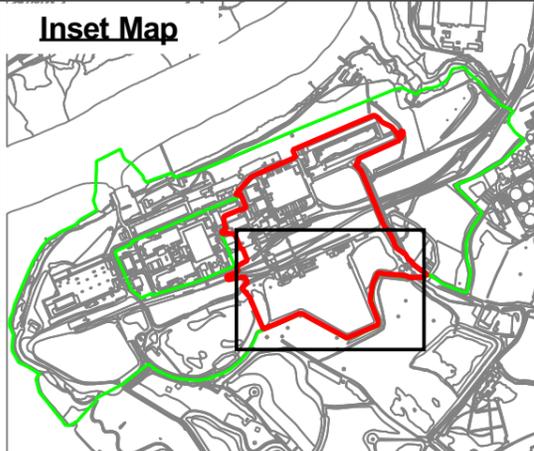
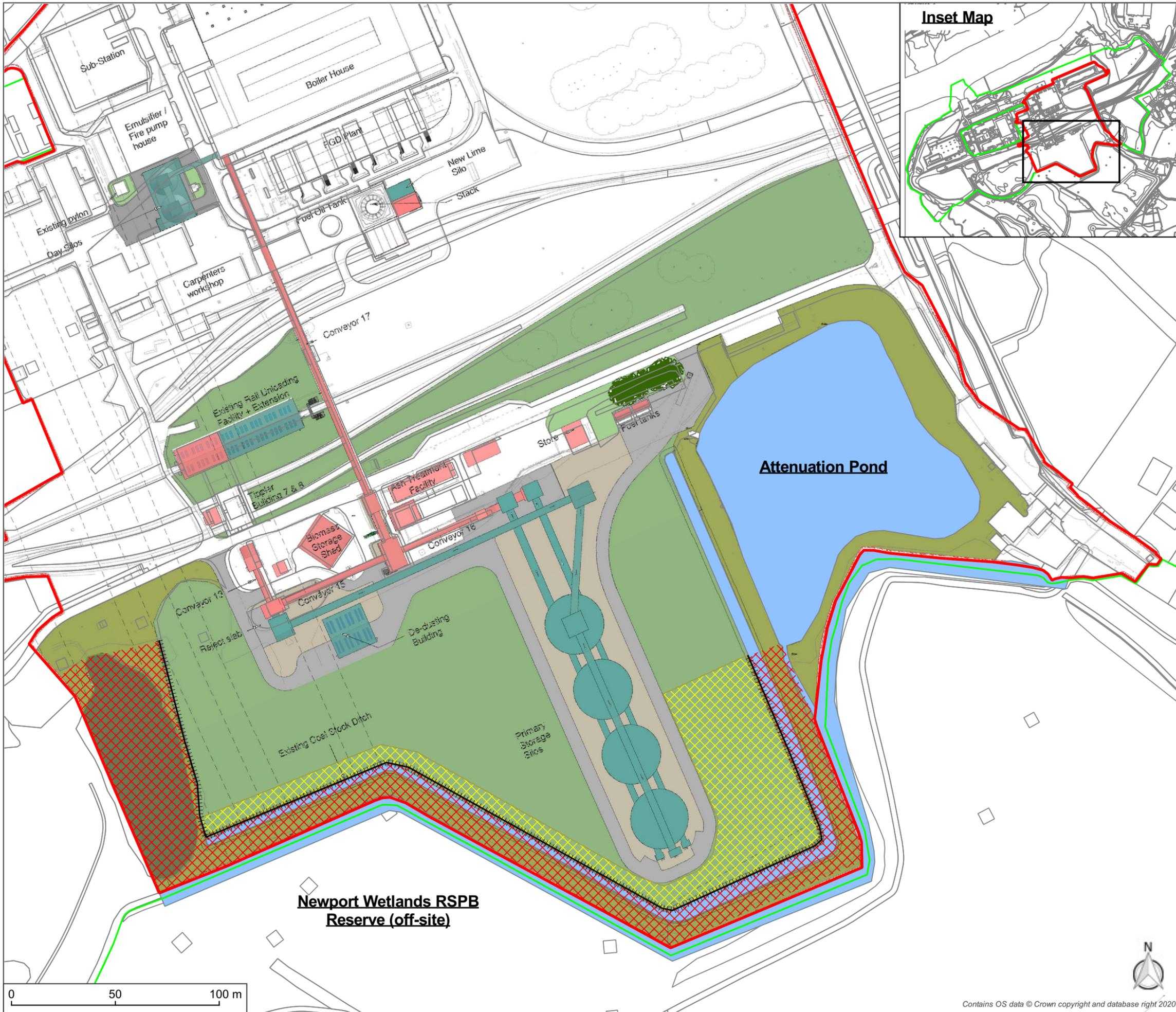
**Drawing 2** Ditch Habitat Enhancement

**Drawing 3** Ditch Protection Plan





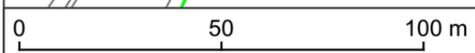
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- Legend**
- Landholding boundary of power station
  - SUP Red line boundary
  - ++++ Proposed herace fencing to mark the contractor exclusion area
  - ✕ Contractor exclusion area
  - ▨ Exclusion area buffer - Area where no materials are to be stored due to proximity to ditch

**Newport Wetlands RSPB Reserve (off-site)**



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Rev	Description	By	CB	Date



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Client Simec Atlantis Energy Ltd  
 Project Uskmouth Power Station - Water Vole Conservation Strategy  
 Title Ditch Protection Plan

Status	Drawn By	PM/Checked By
DRAFT	LW	TO
Project Number	Scale @ A3	Date Created
ECO01486	1:1,750	Dec 2020
Drawing Number		Rev
ECO01486-001		A

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# Appendices

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## Appendix A

### Ditch Sections Descriptions

Ditch Section	Length	Ditch Habitat	Channel	Bank profile and substrate	Potential Value of Habitat for Water Vole
1	72m	Dense bramble thicket with mature shrub willows	c2m wide channel hidden by overhanging bramble  Shaded channel with reed  Water depth estimated to be <0.5m in the centre	Steep soil banks  45-75°	Low  Likely absence
2	16m	Short section of dense willow scrub forming a closed canopy over the ditch channel	c2m wide  Shaded open water with sparse reed  Water depth estimated to be <0.5m in the centre	Steep soil banks on both sides  45-75°	Low  Likely absence
3	24m	Reed on northern bank and northern side of the channel; extensive bramble thicket on southern bank	c2m wide channel with dense reed and unvegetated open water partially overhung by bramble  Water depth estimated to be <0.5m in the centre	Soils banks c45°	Moderate  Presumed presence
4	33m	Bramble and reed thicket with scrub willow	c1m wide channel  The channel and vegetation is heavily shaded  Water depth less than 30cm with reed forming a mat across the surface of channel in places	Steep soil banks  c45-60°	Low  Likely absence
5	136m	Coarse grasses, scrambling bramble and tall herbs on northern bank with scattered but maturing scrub	c2-3m wide open water channel with reed on the margins and occasional patches in the channel  Water depth is approximately 1m	Banks comprising made ground with a high percentage of stone material  Top of the northern bank has c45° gradient becoming near vertical at base	High  Confirmed presence at eastern end

		Dense bramble thicket on southern bank with one large patch of Japanese knotweed (off-site)	Largely unshaded with only scattered scrub including the non-native invasive species butterfly bush and sea buckthorn	but with occasional narrow berms above the water Southern bank is undulating and steep hidden by bramble	
6	285m East and central = 205m West = 80m	Long section of reed dominated ditch with scrambling bramble and reed with scattered young scrub on the northern bank  Extensive impenetrable bramble thicket alongside the northern bank (Section 6b)  Dense bramble thicket on southern bank	c2-3m wide channel with dense bed of reed filling much of the channel with only localised areas of open water  Water depth between 0.5 and 2m with anticipated dense mat of old reed material	Banks comprising stone and soil material  The gradient of the northern bank is 50-70°  Southern bank is 3m high and near vertical with bramble thicket extending over higher ground further back from the ditch	Moderate Presumed presence
7	27m	Wooded section of ditch channel with shrubs saplings and sparse ground cover on the northern bank and overhanging bramble thicket on the southern bank	3-4m wide open water channel with few patches of reed. The whole section is heavily shaded by mature shrubs.  Water depth <0.5m with leaf litter visible on the silt substrate in the base of the ditch	Banks high percentage of stone.  Banks are c70° but the base of the northern bank is shallow creating a narrow berm  Southern bank is very steep hidden beneath bramble	Very low Likely absence
8	60m	Dense reed extending across the ditch across the ground adjoining the northern bank.  Southern bank is bramble thicket with reed growing at the base	2-3m wide channel dominated by reed with a deep mat of fallen dead stems and leaves  The channel is virtually dry with minimal water depth (maximum 20cm)	Both banks are soil and lack stone material. The northern bank is lower than other sections c1m with a c45° slope and is bounded by a higher berm of grass  The southern bank has a steep gradient of c75° and is 3m high	Moderate Presumed presence

9	146m	Inaccessible Dense reed and bramble lacking open water and partially shaded by scrub and bramble	Dense reed covering the channel. No extensive areas of open water are visible on aerial photography	Presumed to be soil banks consistent with adjoining sections	Low/ Moderate Presumed presence
Reedbed	1,423m <sup>2</sup>	Oval man-made reedbed separated from the ditch channel by a 10m wide strip of bramble, reed and tall herb	Reed monoculture with deeper area on the southern side defined by a small area of unvegetated open water and a wider area of less dense reed growth	Near vertical soil banks c0.5m were noted in places at the accessible edges of the reedbed	Moderate Presumed presence
10	160m	Partially wooded ditch with more open areas with dense bramble on both banks with one area that is reed dominated	The character of the channel is variable. There are sections that are heavily shaded by trees where the channel is open water. The southern side of the channel also tends to be shaded by overhanging bramble  In more open sections bramble thicket on both banks shade the channel and obscure visibility  Water depth 0.5 – 1m	Soil banks Steep northern bank c75° with a shallow sloping strip at the base just above water level  Southern bank is lower 1-2m high and mostly steep sloping.  At the western end the southern bank has large stones/rocks at the base of a constructed bank.	Low Likely absence
11	60m	Open section of ditch with bramble thicket on the northern banks and tall herb on the southern with reed in the channel  Woodland edge trees set back from the channel to the north	c1-2m wider channel with dense reed lacking areas of open water  Water depth is shallow <0.5m	Soil banks with sloping 45° low banks up to 1m high on the northern and southern sides of the channel	Low Likely absence

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## Appendix B

### Ditch Section Photographs

**Section 1 Bramble thicket**



**Section 2**



**Section 3 Dense Reed**



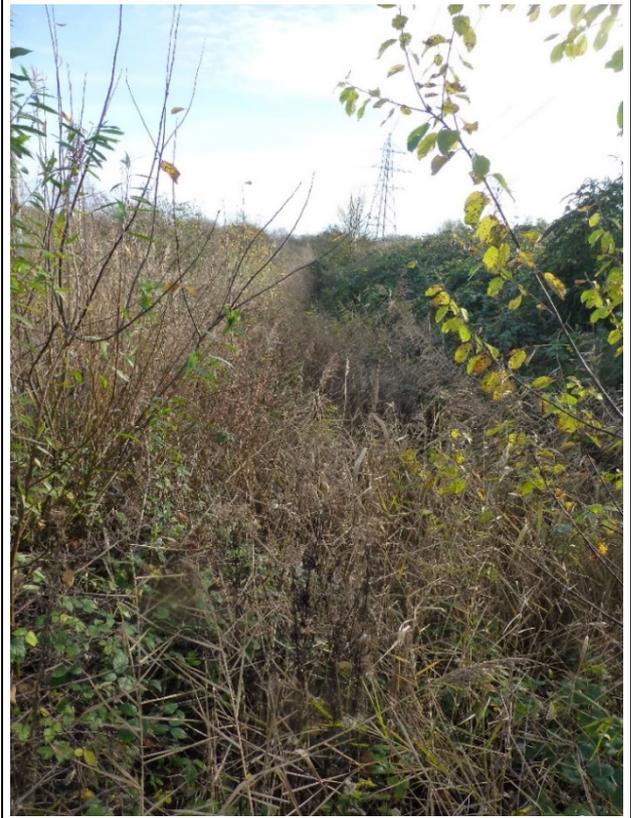
**Section 4 Scrub and Bramble**



**Section 5 – open water channel**



**Section 6 – dense reed filled channel**



**Section 7 – wooded channel**



**Section 8 – dense reed**



**Section 9 (inaccessible eastern end)**



**Section 9 (western end)**



**Reedbed (adjoining Section 9) – northern edge**



**Reedbed (adjoining Section 9) – southern edge**



**Section 10 – wooded channel**



**Section 10 – Bramble thicket**



**Section 10 western end**



**Section 11**



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## Appendix C

# Mitigation and Monitoring Programme



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## Appendix D

# Ditch Management Plan

**Boundary Ditch - Habitat Management Actions and Programme**

Task	Habitat	Ditch Sections	Management Action	Frequency	Timing
1	Open water and marginal vegetation - Ditch channel	Sections 3, 5, 6, 8 and 9  Potentially Section 11 would also be included in the medium term following the eradication of giant hogweed.	Periodic casting of sections of the ditch channel to maintain open water and create balance between reed / marginal vegetation and open areas	To be determined by ditch habitat and rate of reed recolonisation recorded through monitoring  <i>Casting would be rotational with no more 30% of the length of the ditch cast in any one year</i>  <i>It is estimated that each section would be cast once every 4 to 6 years following the casting in early 2022</i>	Between mid February and mid April
2	Native bankside scrub and trees	Sections 1 – 6 and 8, 9 and 11.  Currently excludes the wooded sections 7 and 10. Ongoing water vole and habitat monitoring will review the benefits of selective cutting back of the canopy of bankside shrubs and trees	Periodically cut back native scrub on bank of the ditch channel to prevent extensive shading Retain semi-mature trees for biodiversity.	Determined by ditch habitat and rate of reed recolonisation recorded through monitoring  <i>Estimated frequency once every 4 to 6 years, on rotation – with no more than 2 sections cut back in any one year</i>	Between September and February
3	Herbaceous vegetation and reed on ditch banks	Sections 3, 5, 8, 9 and parts of Section 6 (dense bramble thicket set back from the channel to be retained as cover)	Cut tall herb and grass vegetation using a bladed cutter to reduce sward height to 100mm All arisings to be removed after cutting.	Annual (Ideally cut in warm dry weather)	September
4	Bramble scrub	Sections 4 and 10  Sections 5, 6 (eastern end), 9  Sections 1 and 6 (western half)  Southern bank (off-site) – Sections 6, 8, 9	Cut bramble on the banks to ground level in locations where it is completely growing over the ditch channel and remove arisings  Cut bramble to ground level where it is encroaching herbaceous bank habitat as directed by ecologist and remove arisings  Retain dense bramble thicket set back from the ditch channel - cut back bramble growing over the channel where possible  Subject to NRW permission, cut back bramble overhanging the channel using long reach machinery and remove arisings.	Biennial – outside the water vole main active season and bird nesting season  Annual  None  Biennial	November and February  November and February  n/a
5	Broadleaved woodland	Sections 7 and 10	Largely non-intervention management - retain all semi-mature trees overshadowing the wooded sections of the boundary ditch;  Limit tree surgery to maximise the deadwood habitat in the maturing trees – targeted to significant risks to the safety of site personnel and where impacts on protected species (bats, birds) have been assessed.  Remove any branches that fall into the ditch channel to remove potential obstructions to water movement	n/a  as required  as soon as practical after discovery	n/a  Ideally September to February  No seasonal restriction

Task	Habitat	Ditch Sections	Management Action	Frequency	Timing
			Review the selective cutting bank of bankside shrubs to reduce the level of shading where it does not reduce the ecological value of the woodland.	Every 4-6 years as part of the scrub management programme (Task 2)	
6	Reedbed	Adjoining Section 9	Low-intervention management Periodically cast the deepest part of the reedbed with a long arm excavator to remove accumulated organic matter and reed root mass - approximately 10% of the total area of reedbed Reinstating open water habitat within the mature reedbed All arisings to be removed	Once every 4 to 5 years aligned to the casting in the boundary ditch	Between mid February and mid April
7	All habitats	All Sections	Systematically remove all litter from within the ditch channel and banks	Monthly	All year round
<b><i>Invasive non-native plants (Actions are part of site-wide control of non-native invasive plants)</i></b>					
8	Japanese knotweed	Section 5 (off-site on southern bank)	Ideally herbicide treatment in late summer – if practicable and subject to NRW approval as landowner  Monitoring to record any new stands	Annual  Annual	August / September  August
9	Giant hogweed	Section 11 with a few plants present in Section 8	Herbicide treat all giant hogweed plants in late summer including immature growth and basal leaves Do not allow any flowerheads to mature and set seed  Monitoring to record any new stands	Annual  Annual	August / September  August
10	Sea buckthorn	Primarily Sections 5 and 6	Cut back all sea buckthorn to ground level Accredited contractor to inject stumps with herbicide approved for use near water	Incorporate into scrub management programme (Task 2)	Between November and February
11	Butterfly bush	Primarily Sections 5 and 6	Cut back butterfly bush to ground level where it forms dense stands and review need for herbicide injection	Incorporate into scrub management programme (Task 2)	Between November and February