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Final

Water and Environment Management Framework

Lot 3 – Engineering and Related Services

York Flood Alleviation Scheme River Foss Flood Storage Area Landscape and Ecological Management Plan

November 2019

Environment Agency

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Quality Management

Job No	CS/079290		
Project	York Flood Alleviation Scheme		
Location	City of York unitary authority, site north-east of Strensall centred at approximately SE64976323 (464976, 463232)		
Title	River Foss Flood Storage Area Landscape and Ecological Management Plan		
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1. Introduction

Capita Real Estate and Infrastructure has been commissioned to produce this Landscape and Ecological Management Plan (LEMP) for the River Foss Flood Storage Area (FSA) scheme, on behalf of the Environment Agency.

This is a working document and will be updated at relevant stages of the project. It has been provided to Ryedale District Council and City of York Council in support of the planning application for the River Foss Flood Storage Area and will be updated during detailed design, if deemed to be required as a planning condition by the Local planning authorities.

Upon detailed design and construction, this LEMP should be reviewed and amended where and when it is deemed necessary to account for any changes in suitability. All changes are to be approved by the Environment Agency and any other key stakeholders as stipulated by the Environment Agency.

1.1 Scope/ purpose of LEMP

The purpose of this LEMP is to outline appropriate landscape and ecological management measures to ensure the successful establishment of proposed habitat creation and landscaping on site, thereby contributing towards the delivery of ecological and landscape mitigation measures as well as the achievement of net enhancement to biodiversity in accordance with the NPPF.

The LEMP shall therefore:

- Be submitted to the Local Planning Authorities as part of the planning application and approved in writing by the Local Planning Authorities prior to the commencement of the works;
- be carried out as approved and any subsequent variations shall first be agreed in writing by the Local Planning Authority.
- set out the management and maintenance of the proposed mitigation and enhancement measures, as recommended in the submitted Ecology Report.

Maintenance prescriptions have been formulated to maximise the ecological and landscape value of the proposed development. This Plan covers the management and maintenance of the following features on site:

- Existing trees within the flood storage area
- Newly planted trees
- Areas of created habitat
- Management of invasive species
- Silt accumulation in the created wetlands and siltation ponds

Details of maintenance regimes and management responsibilities that are not provided in at this time will be added to subsequent versions of the document, following any requirements or conditions imposed by the Local Planning Authorities.

The plan covers the first 5 years of maintenance, after which, the plan should be revised and updated, if required with new objectives and adjusted methods or action, following monitoring of the success of the measures proposed in this iteration of the LEMP. This should be undertaken in consultation with any relevant stakeholders, including any emerging residents groups.

The LEMP addresses landscape and ecological mitigation issues only. Note that there may be other conditions related to environmental matters, such as transport and others.

The mitigation and management of construction activities are not extensively covered in this document and have been captured in the Environmental Action Plan (EAP) produced for the scheme. This details specific requirements to be followed in order to protect identified receptors and manage the implementation of all identified mitigation measures prior to and during construction.

This LEMP should be read in conjunction with the Landscape Masterplan and the Landscape Specification for EA Landscape Works Implementation and Maintenance Works which will be completed with detailed design proposals.

1.2 Existing site conditions

The area is characterised by extensive flat and open arable fields along both banks of the River Foss, intersected by a network of drainage ditches and hedgerows delineating field boundaries. The open landscape of the site is also interrupted by occasional farmsteads and patches of woodland. The River Foss and the Black Dike are the two principal watercourses running across the site. Both of these are slow flowing with steep riverbanks showing visible signs of modification and straightening. The banks of both watercourses are covered with swards of species poor grassland and tall ruderal vegetation.

Scattered trees are also located along linear features across the site, such as hedgerows, Lilling Low Lane and Ings Lane. The large majority of these consist of mature ash and oak.

1.3 Proposed development/scheme

The proposed storage area which has been designed to store up to 1,000,000 m^3 of excess flood water would occupy a total area of approximately 130 ha. This amount of excess water would result from a 1-in-100 year flood event including the effects of climate change up to the year 2080. Water will be retained by a 1.65 km long embankment incorporating a passive control structure as it crosses the River Foss restricting the river's maximum flow by means of a 1900 mm diameter orifice/opening. The embankment will incorporate an impermeable clay core along its entire length and will be built in two sections either side of the flow control structure. Starting 160m west of the River Foss the first section of embankment will begin at ground level and rise to meet the top of the flow control structure. From the east bank of the River Foss and flow control structure, the second section will run parallel to (but mainly set back from) the west bank of Black Dike before changing direction towards the north-east, and ending just before, Lilling Low Lane.

In order to prevent overtopping or failure of the control structure during extreme events, a 560 m long spillway (protected by voided concrete blocks) set at 18.80 m Above Ordnance Datum (AOD) has been included in the design of the embankment, allowing excess water to flow into the Black Dike. The crest level of the embankment will be 19.85 m AOD, allowing for 1050 mm freeboard above the spillway, and tie in to higher ground adjacent to Lilling Low Lane and on the right bank of the River Foss.

A total of four borrow pits, two permanent and two temporary, will be excavated in order to source the 112,000 m^3 of clay required to construct the embankment and create wetland and other habitat to provide environmental mitigation:

- Two temporary borrow pits (T1 to the west of the Foss and T2 to the east) will be excavated, with the voids subsequently being backfilled with material that does not meet the required safety standards for use in the embankment. The land will then be fully reinstated to its previous level and land use;

- Borrow pit P1 on the west bank of the Foss will be excavated and the fill used within the embankment core. The borrow pit will be retained permanently and landscaped to provide wetlands and associated water dependent habitat;
- Borrow pit P2 on the east bank of the Foss will be excavated, with some of this material used for fill material within the shoulders of the embankment and some material used as donor material to backfill borrow pits T1 and T2, to reinstate them. This pit will thereafter be retained permanently and landscaped to provide wetlands and associated habitats.

In addition, road-raising is proposed at Ings Lane to maintain dry access and egress to/from Lilling Green during the operation of the flood storage area. The road will be raised to 19.1 m AOD over a length of 200 m, matching the level of the existing bridge crossing the River Foss.

Further elements of the design include:

- The diversion of a 119 m reach of the Black Dike towards the east, as it currently lies within the proposed footprint of the embankment. This will consist of a 2-staged channel.
- Bank reprofiling along 225 m of the River Foss, between the proposed borrow pits and the control structure, introducing lower and higher berms to the channel profile;
- The embankment will be afforded additional buried scour protection along short sections on both its dry side and its wet side. On the dry side, the scour protection will extend for 50 m to protect the embankment against the Black Dike whereas 75 m of scour protection will be installed on the wet side of the embankment to protect it from scour caused by the River Foss;
- A small area of hardstanding with access from Lilling Low Lane will be created at the eastern end of the embankment in order to provide a loading/unloading and parking area for grass cutting and other maintenance vehicles;
- Edge reinforcement will be provided along Lilling Low Lane, north of the embankment, to minimise the impact of flood water on the integrity of the lane. The design of the edge protection has been provided by North Yorkshire County Council and will consist of a trench filled with concrete inserted below the road edge;
- An asphalt access track will run along the crest and base of the western segment of embankment, connecting to the existing farm track to the west of the control structure, providing access for maintenance of the structure;
- A ramp capable of accommodating a combine harvester will be integrated into the design of the embankment, allowing the farmer convenient access to land on both sides of the embankment;
- Lilling Lane Dike, a drainage ditch currently feeding into Black Dike will be diverted into the River Foss, via borrow pit P2, with the remainder of the drainage ditch to be filled on the wet side of the embankment and retained on the dry side, continuing to provide land drainage. An 11 m section of the drainage ditch will be culverted in order to provide access across the ditch for the farmer;
- Borrow pit P1 will be reconnected to the River Foss by lowering the west bank of the River Foss. Borrow pit P2 will be reconnected to the River Foss via a culvert covered with a flapped outfall;
- Both permanent borrow pits will be accompanied by silt ponds to capture excess silt before it feeds into the River Foss. The silt pond on borrow pit P1 will be located at the inlet of the drainage ditch into the borrow pit whereas the silt pond on borrow pit 2 will be located at the inlet/outlet to the River Foss;

- A new permanent access route to the control structure will be created to the west of the embankment avoiding any areas that would be flooded during a 1-in-100 year event. In order to achieve this, an existing access track running north to south will be improved with a new surface using crushed stone. Improvements will also be made to the existing track running northwards from the western edge of the embankment, on the west bank of the River Foss. A new 560 m track running east to west will be constructed, connecting the two aforementioned sections of track.

1.4 Summary of landscape and ecological proposals

The following landscaping and habitat creation measures have been integrated into t design if the scheme and shall be implemented during construction:

- Creation of large ponds/lakes in the location of the borrow pits
- Diversion of a land drain to feed into the wetland area
- Creation of a siltation pond at the inlet of the land drain
- Creation of marginal habitat consisting of reed beds and marshy grassland
- Creation of further habitats around the wetland areas, such as species-rich grassland and shrubs.
- Creation of species-rich grassland and marshy grassland along the left bank of the River Foss, between the wetland and the control structure.
- Tree planting in multiple locations throughout the site to compensate for loss of trees and shrubs and create landscape connectivity. Namely:
    - around the proposed wetlands
    - along either side of the embankment, on the right bank of the River Foss
    - Along the north of Ings Lane.
- Creation of marginal habitat in the Black Dyke diversion
- Creation of marginal habitat along the re-profiled River Foss

1.5 Proposed Management Plan

Tables 2.1, 2.2 and 2.3 on the following pages present the LEMP.

- detail extent and type of new planting and seed mixes. This should be appropriate native species of UK provenance.
- Control of non-native invasive species throughout the site at the earliest stage and maintain an ongoing programme of removal and control.
- General establishment in the early years, maintain weed/brash free zones for all the planting stations.
- Management of bankside vegetation,
- retaining a buffer zone that reaches the water's edge, and free from disturbance.
- Management of the areas are as follows, all areas of planting in Year 1 are to be managed by the Environment Agency, unless agreed otherwise. From Years 2-4 the site adjacent to the introduced waterbodies will be managed by the EA Ops Team, while the remaining land will be returned to the landowners. Two 9 m strips on one of the banks of the River Foss and the Black Dike are to be managed by the Internal Drainage Board (IDB), in

order to maintain their access for desilting of the River Foss and the Black Dike.

Table 1.1 York Flood Alleviation Scheme – Scheme Summary

Scheme Description	See description in section 1.3 above.
Site Description	The proposed site of the development is located along the River Foss, approximately 2 km north of the village of Strensall and 10 km north of the centre of York. The area is characterised by extensive flat and open arable fields along both banks of the River Foss, intersected by a network of drainage ditches and hedgerows. The open landscape of the site is also interrupted by occasional farmsteads and fragments of woodland. The land is open, flat and predominantly arable. There are limited hedgerow trees and shrub vegetation to the large field boundaries. Numerous water features intersect the area, including the Foss and Black Dike, small streams and ephemeral ponds. There are few buildings within the area, mostly consisting of farm buildings and outhouses. Large scale pylons cross the area from east to west The site falls between two administrative authorities with most of the site falling within the jurisdiction of Ryedale District Council and the southern section of the site falls under the City of York Council
Landscape and Visual Potential Issues	• Integration into the surrounding landscape • Provide interest for the user: local identity • Provide interest: planting along paths • Screening: long views • Screening: close views • Screen from adjacent residential properties • Enhancement/enrichment planting

Designated Areas Adjacent to the Scheme	Strensall Common Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC), a European Protected Site, is located over 200 m to the south of the development. YWT Nature Reserve (Strensall Common Nature Reserve) located to the south. There are no listed buildings, conservation areas or designated areas within or adjacent to the flood storage area. A Public Right of Way (PRoW) runs along the north western boundary of the proposed burrow pits (North Yorkshire County Council, Centenary Way Route No 25.57/2/1 and City of York Council PRoW to the southern section of the site, route code 3/16/10. The presence (or potential presence) of the following protected and/or notable species: bird species (e.g. Red Listed species, farmland birds) bats, hedgehog, water vole, otter, brown hare, amphibians, depressed river mussel, fish (such as salmon) lampreys and eel. .
Existing Habitat	The majority of the site consists of large expanses of arable land. Some field boundaries are marked by hedgerows and a network of ephemeral drainage ditches that contain standing or slow flowing water during wet months but remain dry during periods of lower precipitation. Blocks of deciduous woodland are located on the right bank of the River Foss and along the left bank of the Black Dike with larger areas of woodland associated with Strensall Common also present to the south of the site boundary. This is dominated by oak *Quercus spp.* and birch *Betula spp.* Scattered trees are also located along the boundary features are early mature ash and oak. Numerous ponds are scattered across the landscape, within the arable fields, the majority of which remain wet throughout the year as they are groundwater fed. These ponds are surrounded by areas of scattered scrub tall ruderal vegetation. the north-west corner of the site is an area of improved pasture. This is heavily grazed by horses. Across the site the site there is a series of wet and dry ditches. These form a network between the agricultural fields and are prone to drying out. The River Foss and the Black Dike are two slow flowing watercourses on site with steep riverbanks. and visible signs of modification and straightening. The watercourses on site are lined with swards of species-poor grassland and tall ruderal vegetation. Other grassland areas on the site, including field margins are also dominated by species poor grassland. Some of these are also accompanied by dense areas of non-native invasive weeds such as Himalayan

	Balsam and Giant Hogweed, particularly along the bank of the River Foss. The hedgerows within the site are species-poor with associated trees and are dominated by elder and hawthorn. On site Habitats of Principal Importance within the survey areas include, hedgerows, ponds, ditches and dikes and mixed deciduous woodland.
Existing Habitat Summary	• Extensive areas of arable land • Species-poor hedgerows along field boundaries • Small patches of broadleaved semi-natural woodland • Occasional scattered broadleaved and coniferous trees and scrub • Improved grassland • Species-Poor Semi-Improved grassland • Ponds surrounded by tall ruderals • Running Water • Species-poor hedgerows • Structures – occasional bridges crossing the River Foss and culverted section along the Black Dike • Structures- occasional farm buildings
Summary of Scheme Works Operations Required	• Cutting Grass: wildflower and conservation area • Native Woodland Belt mix to tree and shrub areas • Grassland management • Tree works • Hedgerow maintenance • Treatment of arisings • Rabbit protection • Irrigation • Firming in plants • Infill /gapping up • Irrigation of trees • Pruning of dead/diseased and cleaning through plots

	• Formative pruning of shrubs • Removing and replacement of poorly performing/ dead specimens • Repair post and rail fence • Rabbit spiral guard: Installation and inspection • Tree/shrub shelter installation and inspection • Rabbit guard removal • Vegetation control- grass plots-brambles, gorse, broom by herbicide • Vegetation control – noxious pernicious weeds (Injurious Weeds Act, Wildlife and Countryside Act) • Vegetation control – planting plot, by strimming cutting or by herbicide • Vegetation control: along a hedge • Vegetation control: areas around trees • Grub out tree or shrub stumps • Formative pruning of trees • Tree felling • Plant feathered trees • Plant shrubs • Plant hedge plants • Plant transplants (tree and shrub whips) • Plant marginal aquatics • Plant wildflowers – seeding • Management of silt build-up and disposal

Table 1.2: Ecological Management Measures

No.	Objective	Action	Timing	Notes/further action	Completed? (initial/date)	Signed off (as applicable) • Council officer • Qualified ecologist • Other?
E1: Vegetation						
E1.1	Ensure successful establishment of reedbed habitat	Plant in appropriate season	May-June	Establishment of new sites must be carefully considered in order to accommodate effective management methods. Rotational management will be required to sustain healthy habitat. Management should adopt methods in accordance with guidance such as: RSPB Bringing Reedbeds to Life; Wetland Restoration Manual (Wildlife Trusts, 2001), Wet grassland guide (RSPB, 1997).		
E1.2	Ensure successful establishment of trees on site	Plant in appropriate season	Oct-March	Watering programme should be monitored to ensure that at times of water shortage (e.g. drought) sufficient water is applied to meet the conditions.		

No.	Objective	Action	Timing	Notes/further action	Completed? (initial/date)	Signed off (as applicable) • Council officer • Qualified ecologist • Other?
				Inspect stakes and ties to trees, twice yearly or after severe weather. Remove stakes and ties as soon as trees are self-supporting. Monitor and replace failed planting with new plants between October and March.		
E1.3	Ensure successful establishment of meadows/grasslands	Plant in appropriate season	May-June	In the first year, long grass meadow areas should be managed more intensively to prevent the intrusion of invasive ground flora and allow a diverse flora to develop. The first cut should occur when the grass reaches approximately 100mm, down 30mm, followed by subsequent cuts every 6 weeks down to 50mm		

No.	Objective	Action	Timing	Notes/further action	Completed? (initial/date)	Signed off (as applicable) • Council officer • Qualified ecologist • Other?
				throughout the first growing season. Meadow areas from year 2 onwards will be maintained with a biannual cut in May/June and in September. After the cut from year 2 the arisings should be left for one week then raked off. This will allow seeds to fall and maintain species diversity.		
	Ensure successful establishment wetlands	Plant in appropriate season	Planting new stock- August/ September	Visually inspect inlet and outlets monthly for blockages & damage and remove blockages and repair as required. Visually inspect water levels monthly within each bed. Strim around the edges of the wetland cells but leave a 1 m margin to		

No.	Objective	Action	Timing	Notes/further action	Completed? (initial/date)	Signed off (as applicable) • Council officer • Qualified ecologist • Other?
				provide edge wildlife habitat, since these areas can support a wide range of species. Remove sediment every 1-5 years from settling pool and main wetland area Cut back vegetation around inflow and outflow pipes twice yearly.		
E2: Water Voles						
E2.1	Ensure that water vole mitigation measures are successfully delivered.	Pre-commencement survey to establish location of active water voles and habitats and the most appropriate mitigation strategy. Required mitigation measures and management regime.	Prior to site clearance and commencement of construction works Apr-Jun and Jun-Sept surveys	Water voles may be required to be displaced or translocation which require specific timings and licences and mitigation/enhancement of habitats prior to these exercises. River banks and ditches should be managed in line with the Water Vole		

No.	Objective	Action	Timing	Notes/further action	Completed? (initial/date)	Signed off (as applicable) • Council officer • Qualified ecologist • Other?
				Conservation Handbook (currently 3rd edition), The Mammal Society Guidance Series: The Water Vole Mitigation Handbook: (Dean, Gow, et al. 2016		
E3: Bats						
E3.1	Ensure that trees and shrubs are maintained to provide foraging resources for bats	Plant trees in appropriate season	Oct-March	Watering programme should be monitored to ensure that at times of water shortage (e.g. drought) sufficient water is applied to meet the conditions. Inspect stakes and ties to trees, twice yearly or after severe weather. Remove stakes and ties as soon as trees are self-supporting. Monitor and replace failed planting with new plants between October and March.		

No.	Objective	Action	Timing	Notes/further action	Completed? (initial/date)	Signed off (as applicable) • Council officer • Qualified ecologist • Other?
E4: Otters						
E4.1	Ensure that otter mitigation measures are successfully delivered	Pre-commencement survey to establish location of active signs of otters or holts If otter holts are active and likely to be damaged as a result of the scheme a EPS Licence may be required Install otter holts for breeding and lying-up/resting sites – this will be necessary mitigation if pre-commencement surveys find active breeding holts	Prior to site clearance and commencement of construction works. Prior to disturbance or damage to existing holts	River banks and ditches should be managed in line with the Otter Breeding Sites Conservation and Management Conserving Natura 2000 Rivers Conservation Techniques Series No.5; 2003. The measures for managing water vole will also benefit foraging otters.		
E5: Wintering and Breeding / Nesting						
E5.1	Avoid disturbance to nesting birds and Schedule 1 birds	Undertake site clearance outside of bird nesting period Mar-Aug inclusive.	Sept-Feb			

No.	Objective	Action	Timing	Notes/further action	Completed? (initial/date)	Signed off (as applicable) • Council officer • Qualified ecologist • Other?
		Pre-commencement checks for active nests if works undertaken in Mar-Aug period or if Schedule 1 birds likely to be present	Mar-Aug			
E6: Reptiles						
E6.1	Avoid intentional harm or killing of reptile species	Undertake precautionary methods of working to avoid intentional injury to reptiles – i.e. phased height cutting of grassland and scrub to avoid harm if retiles sheltering in habitats Avoid disturbing vegetation and sheltering places during Oct-Mar when reptiles will be dormant and at more risk of harm	All year round Oct-Mar			
E7: Non-native Invasive species						
E7.1	Prevent establishment and spread of non-native invasive species on site.	Treat areas of non-native invasive species prior to commencement of site clearance.	Prior to site clearance and earthworks	Where species are not widespread spot treatment with appropriate chemicals may be sufficient.		

No.	Objective	Action	Timing	Notes/further action	Completed? (initial/date)	Signed off (as applicable) • Council officer • Qualified ecologist • Other?
				Specialist sub-contractors and methods may be required.		

Table 1.3 Landscape Management Measures

	Location / Element	Works Description	YR1	YR2	YR3	YR4	YR5	Further Detail	Comments
General Activities									
	Entire site	Through visual inspection, assess the health of all the planting	✓	✓	✓	✓	✓		To include disease check
	Entire site	Litter pick and remove woody debris	✓	✓	✓	✓	✓	Focus attention on access tracks and other areas of hard standing such as the parking area.	
	Flood Storage Area	Undertake arboricultural survey					✓	Survey to be undertaken at the end of the plan period and to focus particularly on assessing the impact of the flooding on the existing and newly planted tree species in the flood storage area.	
	Entire site	Landscape Architects Inspection and Report (Revise LEMP)					✓	Site inspection and report to assess the planting plot conditions and to see if there are any further management recommendations required	To be carried out by Landscape Architect and an ecologist/EA biodiversity officer. To access the planting plot conditions and to see if there are any further management recommendations required.
River Channel Management- the River Foss and Black Dike currently under the management of the Foss Internal Drainage Board									
	Channel of the River Foss and the Black Dike	No management required by the EA as this is under IDB management – it is anticipated that the frequency of desilting					✓		

	Location / Element	Works Description	YR1	YR2	YR3	YR4	YR5	Further Detail	Comments
		activities will be reduced by the scheme. It is recommended that the IDB monitor and review the situation at the end of the maintenance period and adapt their internal management plans accordingly.							
Bankside Maintenance- River Foss and Black Dike currently under the management of the Foss Internal Drainage Board									
	Channel of the River Foss and the Black Dike	No management required by the EA as this is under IDB management – It is recommended that the IDB monitor vegetation growth in the channel and review their management practices accordingly.	✓	✓	✓	✓	✓		
Existing Trees									
	All existing trees within storage area	Inspect and report condition of existing trees on site as part of the aforementioned arboricultural survey.					✓	End of maintenance period	Check trees for dead wood and disease. Evaluate response of the trees to flooding
	All existing trees along Ings Lane	Inspect and report condition of any retained trees interacting with the raised section of Ings lane to		✓			✓	To be checked part way through and at the end of the maintenance period.	

	Location / Element	Works Description	YR1	YR2	YR3	YR4	YR5	Further Detail	Comments
		monitor their response to the development.							
Planted Trees									
	All trees planted within the scheme area	Pruning: Cut back any damaged plant material and remove from site					✓	End of maintenance period	To be pruned to remove dead or dying and diseased material to promote healthy growth and natural shape
	All trees planted within the scheme area	Inspect and report condition of planted trees on site as part of the aforementioned arboricultural survey.					✓	End of maintenance period	Check trees for dead wood and disease. Evaluate response of the trees to flooding
Existing Hedgerows									
	All existing hedgerows within site area	Inspect and report condition of any retained section of hedgerow interacting with the raised section of Ings lane to monitor their response to t development.					✓	End of maintenance period	
	All existing hedgerows within site area and as indicated on drawing	Manage a 3 year rotation on hedges within field margins fencing			✓			Cut in February to allow over wintering birds to feed on berries	

	Location / Element	Works Description	YR1	YR2	YR3	YR4	YR5	Further Detail	Comments
New Hedgerow Maintenance									
		Hedge Trim: two sides and top following 2 years of growth		✓		✓		cut in February to allow over wintering birds to feed on berries	Plot to be maintained as a hedge.
Marginal and Emergent Aquatics + Invasive Species									
	Along the channels of the River Foss and the Black Dike	Remove invasive non-native species (e.g. Himalayan Balsam or Giant Hogweed) using appropriate disposal methods	✓	✓	✓	✓	✓	First check: Early June – before it sets seed. Second check: September.	Deposit arisings in situ for 24hrs to allow invertebrates to return to water before relocating to areas of low conservation value as instructed by the CA.
Species Rich Grassland									
	Across the site	Mow newly sown meadows regularly throughout the first year of establishment to a nominal height of 40-60mm, removing cuttings if dense.Timing to be determined by ecologist.	✓						
	Across the site	Management once established:		✓	✓	✓	✓		Monitor to see if maintenance required of unwanted perennial weeds.

	Location / Element	Works Description	YR1	YR2	YR3	YR4	YR5	Further Detail	Comments
		Once established tussocky grassland requires minimal maintenance. Unwanted perennial weeds (docks, thistles) may need control by occasional spot treatment with a herbicide. To control scrub and bramble development, tussocky areas may need cutting every 2-3 years between October and February. For wildlife this cutting is best done on a rotational basis so that no more than half the area is cut in any one year leaving part as an undisturbed refuge.							
Marsh Grassland									
		It is recommended that this is cut a little each year between October – February (to avoid the bird breeding season)subject to ecologist confirmation.	✓	✓	✓	✓	✓		
Embankment									
	Embankment	Grass on the embankments will be cut to maintain a	✓	✓	✓	✓	✓	During the growing season to be cut as and when	

	Location / Element	Works Description	YR1	YR2	YR3	YR4	YR5	Further Detail	Comments
		dense sward typical between 75 -150mm.						required to maintain height of between 75-150mm	
	Embankment	Grass on the embankment shall be inspected to identify whether any INNS have established. If identified, these shall be removed.	✓	✓	✓	✓	✓		It is recommended that this action is carried out during grass cutting on the embankment.
Natural Regeneration Shrubs - Rewilding									
		Areas that have been allowed to regenerate naturally, will be allowed to regenerate naturally and will require minimum maintenance apart from the removal of noxious weeds.	✓	✓	✓	✓	✓		
Hard Landscape Features									
	Across the site	Inspect and repair post and rail fencing	✓	✓	✓	✓	✓		
	Across the site	Inspect and repair of bat/bird boxes where possible. Replacements might be a better option if boxes are not been used.	✓	✓	✓	✓	✓	Have regard for protected species (i.e. avoid bird nesting season). Bat boxes to be inspected/repaired/replaced only by bat-licensed Ecologist in accordance with NE bat license	

	Location / Element	Works Description	YR1	YR2	YR3	YR4	YR5	Further Detail	Comments
								requirements and with the landowner agreement.	
Soil Management Plan and Soil Testing									
		An element of the flood bund in the creation of several areas of wetland. The soil management plan will describe the result obtained from a targeted soil investigation undertaken in order to identify how the nutrient substrate material can be used during the scheme construction.	✓	✓	✓	✓	✓		soil testing will be undertaken pre construction as part of detailed design to ensure conditions are appropriate for the species to be sown or planted.
Environmentally Friendly Farming Practices									
		Extending grass margin strips at arable field edges results in farming operations, particularly pesticide and fertilizer applications. This will provide some protections from drift	✓	✓	✓	✓	✓		Improved habitat enhancement and management.
		Large grass margins can also act as buffer strips near the watercourses. Marginal vegetation will act as a physical buffer to drift and to	✓	✓	✓	✓	✓		Improved habitat enhancement and management.

	Location / Element	Works Description	YR1	YR2	YR3	YR4	YR5	Further Detail	Comments
		surface movement of water from the fields. This will help to reduce the movement of nitrogen, phosphorous, pesticide and silt into the surface water.							
Agroecology – Hedgerow cutting regimes									
		Reduce the frequency of hedgerow cutting: • Hedgerow species only fruit and flower on wood that is two years old. • This can also lead to an increased production of flowers and therefore more insect and pollinators.			✓				Improved habitat enhancement and management
Borrow Pits / Pond Maintenance									
	Inlets to the created pond and silting pond	Inlets and outlets to be inspected and maintained on a regular basis to identify and prevent blockages.	✓	✓	✓	✓	✓		After a large flood event, the borrow pits and secondary channels (tributary) to be inspected as soon as possible to identify and remove blockages

	Location / Element	Works Description	YR1	YR2	YR3	YR4	YR5	Further Detail	Comments
	Created ponds and associated inlets	The reed beds lining the edges of the created wetlands should be de-silted after 5 years or straight after a large-scale flood events flood events.					✓		It is recommended that the created wetland areas and associated ditch be inspected as soon as possible after large flood events to assess the extent of sediment deposition and any requirement for removal.
	Silting pond	The reed beds in the silting ponds should be desilted after 5 years or straight after a large-scale flood events flood events.					✓		It is recommended that the silting pond be inspected as soon as possible after large flood events to assess the extent of sediment deposition and any requirement for removal
	Created ponds and associated silting ponds inlets	Monitoring and evaluation of deposition rates in the ponds and silting ponds					✓	Monitoring and evaluation of deposition rates in the ponds and silting ponds will ensure that management and maintenance measures are altered, if necessary.	
	Control of invasive non-native species		✓	✓	✓	✓	✓	Monitor for occurrence and instigate appropriate control strategy if found.	Regular annual monitoring is required and control strategies may need to be coordinated as part of a wider catchment strategy programme.