



Design Access and Planning Statement

Giving Nature a Home in the Dearne
Habitat and Visitor Improvement Works
At Old Moor and Wombwell Ings

RSPB

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Contract

This report describes work commissioned by Jayne Wood, on behalf of RSPB. Susannah Goddard of JBA Consulting carried out this work.

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Purpose

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1 Introduction

1.1 Context

This statement forms a combined design, access and planning statement in association with a planning application for the 'Giving Nature a Home in the Dearne' programme of works. The project has been developed to invest in the ecology, infrastructure and visitor experience of the Dearne Valley reserves, specifically RSPB Old Moor and Wombwell Ings. The planning application is submitted for the four elements of the project which are:

- Habitat works: Reprofilling of habitat areas at Old Moor and Wombwell Ings
- New car park at Old Moor: Redesign of existing car park to meet visitor demand
- Discovery zone refurbishment and extension: Refurbishment of existing family facilities and creation of new Wild Play area.
- Family Hide: Replacement of existing aging hide.

1.2 Background to Project

The Dearne Valley is located between the South Yorkshire towns of Barnsley, Rotherham and Doncaster. The area once formed the heart of the South Yorkshire coal mining industry and despite extensive regeneration, the collapse of this industry left a legacy of deprivation that remains to this day. The RSPB have been managing land for nature conservation in the Valley since 2003, with seven nature reserves, covering 315 hectares. These include RSPB Old Moor and RSPB Wombwell Ings.

Old Moor is one of the charity's flagship reserves with over 100,000 visitors per year. It is particularly important for public engagement, demonstrating the importance to people, as well as wildlife, of creating a nature reserve. Significant investment was made to develop the site when the RSPB took over Old Moor from the Council in 2003 with the provision of facilities including café, shop, education programme, family play area, alongside viewing opportunities of important wildlife.

Figure 1-1 Site Location Plan

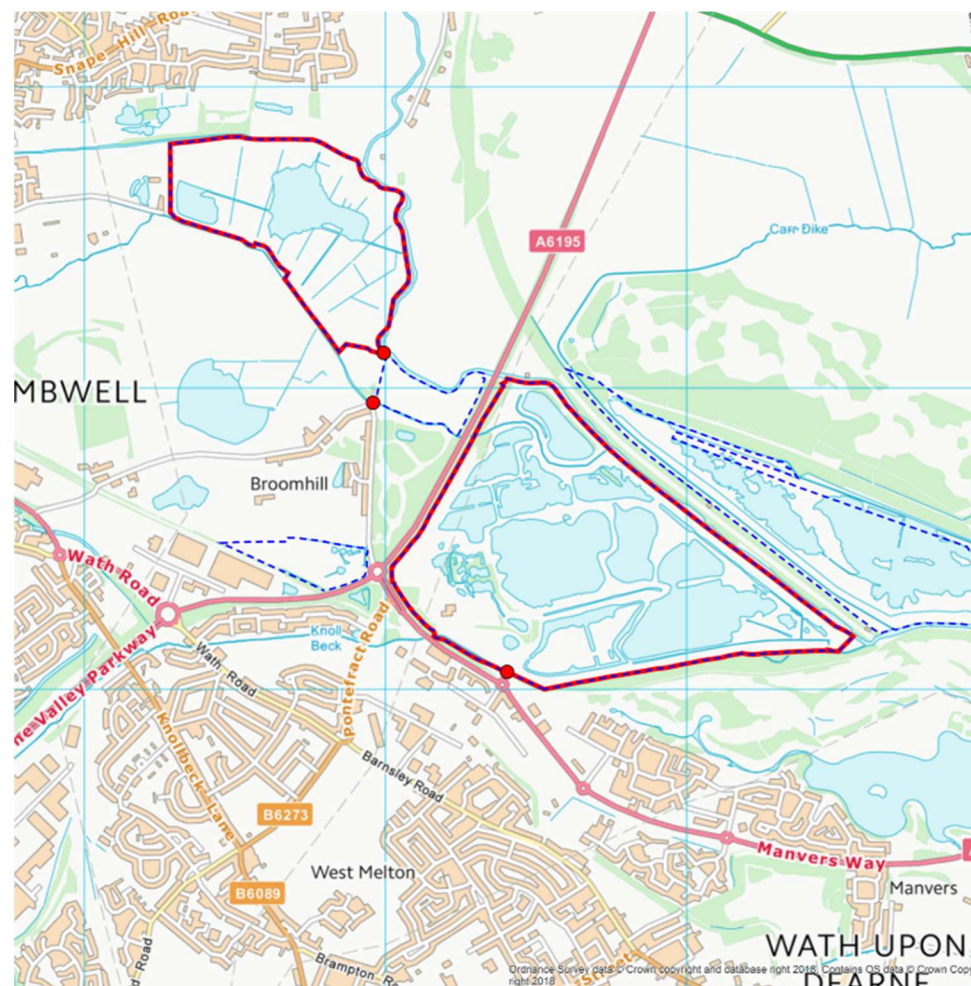


Figure 1-2 Old Moor Existing Site Layout

However, 15 years from RSPB taking on Old Moor, facilities need investment to improve them for the 110,000 annual visitors. There are several ecological problems which require solving and improvements to the habitats to maximise benefits to wildlife.

RSPB have secured Heritage Lottery Funding to deliver a major programme of works called 'Giving Nature a Home in the Dearne' designed to invest in and improve the visitor facilities and habitats at Old Moor and Wombwell Ings. There are four themes to the programme:

- Conserving the Dearne – to improve the habitats and biodiversity;
- Discovering the Dearne – to help families, young people and visitors discover nature and the industrial heritage of the sites through interpretation, natural play and other physical means;
- Sustaining the Dearne – improvements to the facilities such as the car park and visitor to allow us to better welcome visitors to the site and meet their needs;
- Supporting the Dearne – training and support for our volunteers and staffing to run more activities and events for our visitors.

'Giving Nature a Home in the Dearne' aims to deliver a raft of improvements to the habitat quality and visitor experience at Old Moor and Wombwell Ings reserves.

1.3 Background to Planning Application

The planning application is submitted on behalf of RSPB. The planning application includes habitat and visitor experience improvement works across Old Moor and Wombwell Ings reserves. The planning application includes four elements of works under the 'Giving Nature a Home in the Dearne' programme:

- Habitat works: Reprofilling of habitat areas at Old Moor and Wombwell Ings
- New car park at Old Moor: Redesign of existing car park to meet visitor demand
- Discovery zone refurbishment and extension: Refurbishment of existing family facilities and creation of new Wild Play area.
- Family Hide: Replacement of existing aging hide.

1.4 Pre-application Advice

RSPB sought pre-application advice from Barnsley Metropolitan Borough Council (BMBC). A pre-application meeting was attended by Jayne Wood (RSPB), Matthew Caper (RSPB), Hannah Andrew (BMBC Planning) and Trevor Mayne (BMBC Biodiversity). Following the meeting pre-application comments were provided to RSPB from Trevor Mayne via email (19th February 2018). Comments related to ecology and biodiversity considerations. All comments have been acted upon in design development and details provided within this Design, Access and Planning Statement and other documentation accompanying the planning application.

1.5 Environmental Impact Assessment Screening

RSPB sought an Environmental Impact Assessment (EIA) screening opinion from BMBC under Regulation 6 (1) of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017 on 21st June 2018. In response, BMBC confirmed (correspondence from Hannah Andrew to Jayne Wood, 11th September 2018) that an EIA is not required for the proposed development for the following reasons:

- The site is not located within a 'sensitive area as defined in regulation 2(10) of the EIA Regulations 201.
- The proposed development is not Schedule 1 development.
- The proposed development is not classified as Schedule 2 development.

In conclusion, BMBC confirm that the development is likely to have some impact on the environment within this part of Barnsley Metropolitan Borough, the principle impacts being disruption to wildlife and residents during construction and potential longer-term impacts to flood risk and flood storage. However, as proposed works are not listed in schedule 1 and 2 of the Town and Country Planning (EIA) Regulations 2017, and given the scale, nature and setting of the proposal, the environmental impacts would not be significant. Consequently, the proposed development is not EIA development and an Environmental Statement is not required.

1.6 Community Engagement

The RSPB has undertaken engagement with the public with regards to the proposed development at Old Moor and Wombwell Ings. The sites are both highly visited and potential impact on site users as result of the proposals (be this positive or negative) means that adequate engagement is vital to ensure all stakeholders are well informed and able to be involved in the decision-making process. There have been two open public consultation sessions for the scheme during 2018. These are additional to consultations that ran in 2017 ahead of the initial funding application to Heritage Lottery Fund (HLF). The 2018 consultation sessions were as follows:

- On site consultation ran from Monday 23 July through to Tuesday 31 July 2018
- Offsite consultation ran on the 07th & 08th November 12th, 13th, 14th and 15th November. These consultations were based in the local area and included, Wath upon Dearne, Wombwell and Barnsley Libraries, Wath and Wombwell town centres and Darfield Church.

The format of the public consultations was a drop-in event with displays of proposals and opportunities for the public to give feedback on the proposed plans. RSPB staff and volunteers were present to distribute and collect hard copy questionnaires forms and were also tasked with engaging with the public to begin conversations and note down their opinions and gather feedback.

There is a wide variety of site users at Old Moor and Wombwell Ings, and subsequently feedback was varied in terms of priorities and interests. For example, people visiting to bird/wildlife watch consider the wildlife and customer service as a high priority. Families on a day out on the other hand consider that ideas for things they can do on site, and then for wildlife at home are an important and enjoyable part of their visit. The RSPB have been able to use this feedback to shape the development of the project and ensure that visitor and local community are at the heart of the project. Feedback from both consultation events was largely positive and supported the proposed developments.

In an effort to widen community engagement, a series of posters were displayed at Wombwell Ings in 2018. The posters advised on the proposals and invited feedback (contact details provided). No feedback was received. In addition, local councillors were also advised of the proposals and invited to comment. These were Councillor Coates, Frost, Griffin, Markham, Saunders and Wraith. The Rt. Hon Dan Jarvis MP and the Rt. Hon Stephanie Peacock were also informed – both have visited the site previously and are fully supportive of the RSPB in the Dearne Valley. Our local grazier has also been informed of the proposed project.

2 Design and Access

2.1 Site Context

The RSPB manage a suite of seven nature reserves in the Dearne Valley, South Yorkshire. These include RSPB Old Moor and RSPB Wombwell Ings for which habitat and visitor experience improvements are proposed and planning approval is sought. Old Moor and Wombwell Ings are adjacent sites located close to the town of Barnsley. Old Moor is a flag ship RSPB reserve with developed visitor facilities including car park, shop, café, children's play area. Wombwell Ings is an open site accessible via the footpaths which circle the site.

2.1.1 Old Moor

Old Moor is a flagship RSPB reserve with excellent facilities and a year-round easily accessible wildlife spectacle. There are eight hides and two viewing screens available for visitors to use. Two main trails run through the site – Green Lane down to Wath Ings and the appropriately named Reedbed Trail out to the reedbeds. Access to the site is controlled via the Visitor Centre and the site is securely locked outside of opening times.

The site was created in the 1990's following the collapse of the local mining industry. The farm was compulsorily purchased, and soil was taken from here to 'cap' off surrounding polluted land.

Wath Ings at the far end of the site was already a local nature reserve (habitat having formed in the 1930's when a collapsed mine shaft caused surface subsidence). As such, this part of the reserve is the only area that has not seen extensive excavation and engineering meaning all surface geology and any archaeology has long ago been lost.

The site is 89 hectares in size and contains several habitats including open water, islands, reedbeds, wet grassland, fen and marsh, grasslands and meadows and a small amount of woodland.

Figure 1-1 Old Moor Existing Site Layout



Figure 1-2 Wombwell Ings Existing Site Layout

Figure 1-3 Old Moor Existing Site Layout



As a manmade reserve, the hydrology of the site is complex. There are numerous ways water can be moved across the site, although it is often difficult for cells to be individually managed – water often must be brought from or moved into an adjacent cell.

Water enters the site from the River Dearne near the reservoir either by wind pump or via a gravity feed when river levels exceed 18.7m AOD.

The outfall back to the River Dearne is located at the eastern end of the reserve, at the back of Wath Ings. A drop board sluice manages this main outflow and allows control of the water levels (up to 17.3 m AOD). On the other side of the sluice is the Old Moor pumping station. An Environment Agency electric pump returns the water to the Dearne and is controlled via a mercury switch – becoming operational at 16.8m AOD and turning back off at 16.5m AOD.

Water levels are dropped throughout spring to autumn to allow mud to be exposed for the benefit of breeding and passage wading birds. At the end of the autumn, water levels are raised again to benefit wintering wildfowl.

As well as being designed as a site for nature, Old Moor is also an Environment Agency flood washland with a reservoir embankment circling much of the site. Washland operation is achieved via a spillway that activates at 20.07m AOD. Following a flood event, water above 17.6m AOD can exit the site into Knoll Beck via a 120cm pipe fitted with a flap valve. If flooding is severe, there are a further three storm pipes with flap valves directly onto the River Dearne that operate if the water on site is above 18.5m AOD.

Investigations by Ove Arup in 1991 identified that the groundwater is isolated from surface water by a layer of alluvial clay. In addition to this, there are areas of river shale close to the surface on the western side of the reedbeds, but these are away from the proposed areas of work which all sit on alluvial clay.

The site holds a large species assemblage including breeding bittern, bearded tit, avocet, lapwing, tree sparrow and willow tit. It contains a notable assemblage of breeding and passage waders and breeding and winter wildfowl. A large black headed gull colony is of national importance. Full details of species composition and numbers can be provided for either site if required.

2.1.2 Wombwell Ings

Wombwell Ings is a 33 ha nature reserve with wetland and grassland habitat. It is notable for breeding wading birds such as lapwing, redshank and snipe and passage and wintering wading birds. It is also notable for breeding and wintering wildfowl.

It is a single wetland catchment with no direct inputs other than rainfall. The surface water is separated from groundwater by a layer of alluvial clay. The site is slightly bowl shaped, surrounded on nearly all sides by the River Dearne and Bulling Dyke. Years of horse grazing has created a compaction layer just beneath the surface and this appears to be important in ensuring that any rainfall is captured and flows to the centre of the site and collects in a large subsidence flash.

A spine drain runs through the site from west to east – through the subsidence flash – and collects water from a loose network of 60-80cm deep foot drains. The drain connects to a pipe invert into the River Dearne.

A sluice has been installed in front of the pipe invert to allow greater control of water levels on site. An impoundment licence allows water to be held back via this sluice to a height of 20.6m AOD – the sites winter max water level. Generally, natural drawdown in the spring and summer is sufficient on its own to not need to remove any of the sluice boards.

A smaller seasonal flash is created via a second sluice. This smaller flash is also drawn down in the spring and summer to create ideal conditions for breeding waders and water is taken off into the central main drain.

A small semi-permanent pool is located in the south-west corner of the site (corner pond). This fills naturally with rainwater but has no natural outflow and is not drawn down.

The site is an Environment Agency Washland and there is a flood bank surrounding the site with a spillway at 22.6m AOD. Outflow from the site is via a pipe fitted with a flap valve. This is set to 19.83 m AOD.

The site is ringed by a bridleway along the southern edge of the site and public footpath around the rest. A hide on the southern side allows visitors to view the main flash.

Figure 2-4 Wombwell Ings Existing Site Layout



2.2 Site Analysis

2.2.1 Site Access

The Old Moor site is accessed via the visitor centre from the A633 Manvers Way. The car park is used by those visiting Old Moor, and also visitors to Wombwell Ings and users of other local footpaths/bridal ways and the Trans Pennine Trail. Wombwell Ings is accessed from the north of Pontefract Road. There is additional car parking on the roadside of Pontefract Road. The Trans Pennine Trail runs along the Southern edge of the reserve. Access to the reserve is via a bridge into the car park where cycle racks are provided. Details of proposed access routes during construction are provided in Section 3 below.

2.2.2 The surrounding area

Old Moor and Wombwell Ings are located in a semi urban location between the towns of Barnsley (to the north) and Rotherham (to the south). Old Moor is bordered by the primarily residential settlements of Brampton, Wath Upon Dearne and Bolton Upon Dearne. To the south east of the site lies Waterfront Golf course and Brookfields Park business park. Wombwell Ings is located approximately 1 mile north east of the Old Moor Visitors Centre entrance. The residential settlement of Broomhill is located to the south east of the site. Agricultural land bounds the site to the south. The village of Darfield lies to the north.

Figure 2-6 Site Access Plan

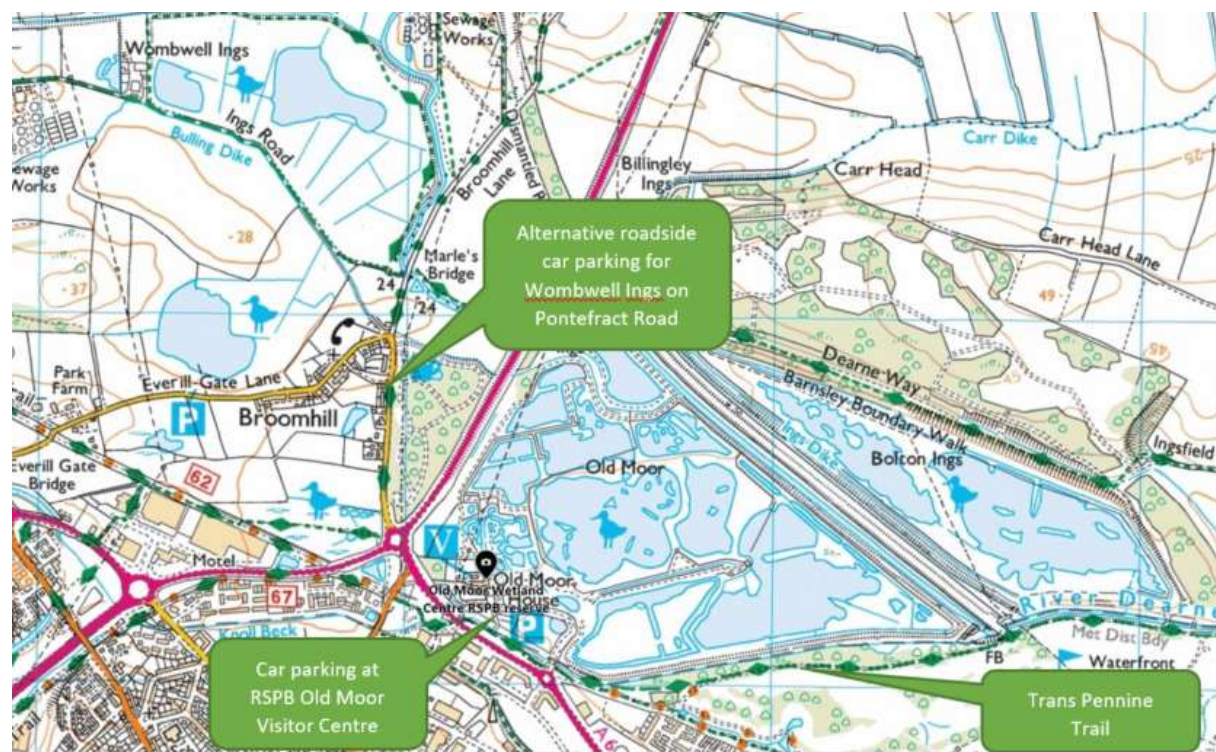


Figure 3-7 Habitat reprofiling at Old Moor and Wombwell Ings

3 The Development Proposal

The overarching objective of the major programme of works called 'Giving Nature a Home in the Dearne' is to invest in and improve the visitor facilities and habitats of both Old Moor and Wombwell Ings sites. The programme of works for which planning permission is sought is divided into distinct projects, each of which will be discussed separately in the following section:

- Habitat works: Reprofilling of habitat areas at Old Moor and Wombwell Ings
- New car park at Old Moor: Redesign of existing car park to enhance safety and visitor experience.
- Family Hide: Replacement of existing aging hide.
- Discovery zone refurbishment and extension: Refurbishment of existing family facilities and creation of new Wild Play area.

3.1 The Brief, Design Concept and Design Solution

3.1.1 The Brief

3.1.1.1 Habitat improvement works

The brief for this aspect of the programme is to reinvigorate the habitats on the two key sites (Old Moor and Wombwell Ings) to deliver a step change in the experience for our visitors and wildlife. The following paragraphs detail the scope of works proposed for each site.

3.1.1.2 Habitat Improvement works at RSPB Old Moor

Re-profiling of the Mere

The Mere is the largest water body at Old Moor but is surrounded by a wide bank with steep edges that provide little benefit to birds. The banks will be lowered to create softer shallower edges providing more attractive conditions for wildlife.

Creation of three rotationally managed compartments with islands

Figure 3-1 Habitat reprofiling at Old Moor and Wombwell Ings



The existing habitat for wading birds is ecologically 'tired' and of a poor design. The habitat will be re-profiled to create better breeding islands and water management. Further re-profiling will create an additional wading bird habitat, with associated breeding islands and water control features. The two main compartments will have a perimeter ditch and fence to exclude predators to ensure that breeding success is maximised. The creation of three habitat 'cells' will enable the RSPB to utilise the latest techniques to manage the cells rotationally, where one is rested and rejuvenated each year, whilst the other two perform to their peak.

Creation of heronry on Wath Ings compartment

An area of Willows on Wath Ings is already used by egrets and cormorants for roosting but by excavating soil (and using it in the re-profiling of the Mere) we will effectively make the area of Willow into an island and safe from predators. This, along with the provision of platforms and egret baskets, should attract herons and egrets to breed, creating a new and important heronry in the Valley.

Addition of artificial nesting and habitat features

Structures such as Osprey nesting platforms and tern rafts will allow us to cater for a wider diversity of species on site and bring the associated spectacle to our visiting audience.

Amendments to water control features

Pipes, sluices and penstocks will be amended to allow the site to be managed more efficiently. This will allow more accurate control of water levels, delivering better conditions for wildlife and associated viewing spectacle.

3.1.1.3 Habitat improvement works at Wombwell Ings

Installation of a water control structures

The water control structures will allow water to be taken from the River Dove. This will, for the first time, provide a source of water and allow full control over water levels.

Creation of additional habitat features

Habitat will be improved by creating islands within the existing waterbody. This increases the amount of exposed mud, where birds feed throughout the seasons and the islands will provide safe habitat for breeding

Creation of a site perimeter ditch with associated predator fence

A new ditch will be created around the base of the flood bank, fed by the new water control infrastructure. This will keep visitors to the footpath on the flood bank, stopping problems with disturbance. It will also keep the horses that graze the site off the flood bank, reducing damage. The addition of a fence will stop predators from entering the site and thus will increase the success of breeding birds. The minimum distance from base of the river embankment to the top of the new bank will be 8 to 10 metres but will be greater than this in most areas.

Installation of livestock control infrastructure

New pens, gates and fencing, linked to the new perimeter ditch, will allow better management of grazing across the site. Grazing is an essential tool for management of the habitat on Wombwell, creating vegetation attractive to nesting birds.

Removal of excess spoil to the storage reservoir on Old Moor

As a flood reservoir it is important not to reduce the flood capacity of the site. Therefore, any excess spoil will be removed and used to raise the bed of the reservoir at the north end of Old Moor. This reservoir lies outside the washland and was created to hold water for use at Old Moor during extended dry periods. However, whilst the reservoir is three metres deep, the outlet is just half metre below the surface meaning that the remaining two and half metres of waters cannot be accessed, regardless of need. By raising the base level, this will allow the establishment of reed and other vegetation and provide additional habitat without affecting flood risk.

3.1.1.4 New Car Park at Old Moor

Old Moor is one of the RSPB's flagship sites with approximately 100,000 visits per annum. Old Moor is the main visitor hub for the RSPB's Dearne Valley reserves. The majority of these visits use the main car park at Old Moor and in addition, the proximity of the Trans Pennine trail means that many more visitors use the car park as a way of accessing the other reserves in the Valley. Our estimates suggest there are up to 160,000 visits per annum within the Dearne Valley reserve network. The existing car park at Old Moor is poorly laid out, muddy and potholed and provides a suboptimal start to the visitor experience.

The brief for the car park is to improve car parking facilities for visitors through the provision of a surfaced car park with formal dedicated bays. The new car park will be entirely within the footprint of the existing car parking area. The new car park will accommodate 112 cars including 6 disabled spaces. Overflow parking will be in the area to the south of the new car park (also within the footprint of the existing car park) and will be able to accommodate 15-18 additional cars if required. The car park design will be signposted and laid out to separate vehicles and pedestrians. An integrated drainage system will ensure that the car park does not hold surface water. A coach layby at the northern end of the car park will also be provided for safe access of coach parties accessing the visitor centre and wider site.

3.1.1.5 Replacement of family hide

The original structure was originally built in 2003 and not for a family audience. The family hide has had limited success but has gone some way helping families transition from the playground and wildlife trail to a place where they can enjoy birdwatching experiences whilst also providing a range of fun activities. It has also been the space where classes on our school visits come to learn about birds. However, the hide is still a traditional space and the glass frontage with hide flaps provide a barrier to comfortable viewing. The existing hide will be replaced with a new viewing structure which is accessible to all and provides a comfortable viewing experience. It will have a high proportion of glazing to improve the viewing experience as well as increasing connectivity to the rest of reserve and approach path. Wide doorways will ensure buggies and mobility scooters/wheelchairs can easily access the hide. The new hide is intended to be a high-profile destination point that will contribute significantly to the family visitor experience at the Dearne reserves.

3.1.1.6 Discovery Zone refurbishment and extension

The current play area on the reserve was created in 2014. The new Discovery Zone has been well received and this, along with new guided and self-led activities for families has contributed to an uplift of visitor numbers in excess of 10,000. However, it is now in need of some refurbishment – particularly around the heritage games area. In addition to the structured play opportunities within the existing Discovery Zone, RSPB have a vision for wild play on the reserve, where children can be immersed in and fall in love with nature. The refurbishment and expansion of the Discovery Zone will provide opportunities for children to climb, roll, crawl, discover, build, invent and explore in nature. At present, Old Moor's landscape and layout does not lend itself to wild play. The site is flat (with little opportunity for height and views over the wetlands), there is little tree cover, and formal paths channel people to the managed areas of the site and away from woodland and reedy ('wild') areas. In addition, loose play materials are absent from the site at Old Moor and the play facilities that exist so far are unidimensional (ie: they can only be used in one way) such as a hop scotch course, a swing.

The newly designed Discovery Zone seeks to refurbish the existing play area and provide an expanded area designed to encourage wild play and exploration. The overarching design intent is to create a natural playable landscape to support adventurous, fun play. The play priorities have been identified as follows:

- To create areas of the landscape that children can become immersed in
- To enable adventurous journeys across the site to discover new 'worlds'
- To introduce 'loose materials' for interaction with the environment.
- To make creative 'play prompts' to support imaginative play.
- To enable children to connect safely with water and mud

3.1.2 Location and Layout

Planning permission is sought for four separate but interlinked elements consisting of habitat remodelling, carpark improvements, replacement family hide and Discovery Zone refurbishment and expansion. A majority of works undertaken will be on the Old Moor site, with the exception of habitat remodelling works associated with the habitat improvement works at Wombwell Ings. Further justification for proposed location and layout of each element is provided below.

3.1.2.1 Habitat Improvement

The aim of the work is to improve the ecological outputs of both sites whilst at the same time improving the wildlife spectacle for our visitors. The Old Moor site was created in the 1990's and in places, the designs were poorly implemented. There is scope to improve several habitats to attract new species and significantly increase their ecological value. At Wombwell Ings, the site is heavily disturbed by walkers and dogs and excluding them will greatly improve the number of birds using the site for breeding and feeding. This will be achieved by creating a wet ditch around the perimeter of the site. The main subsidence flash is rather featureless and creating two islands on here will make it suitable for breeding birds like avocet which regularly use the site for feeding but have never bred.

In terms of layout, the new habitats will be created by moving spoil from some areas of the site to others. As a result, cut and fill volumes are balanced and the flood storage capacity of the site (an EA washland) is not affected.

3.1.2.2 New car park at Old Moor

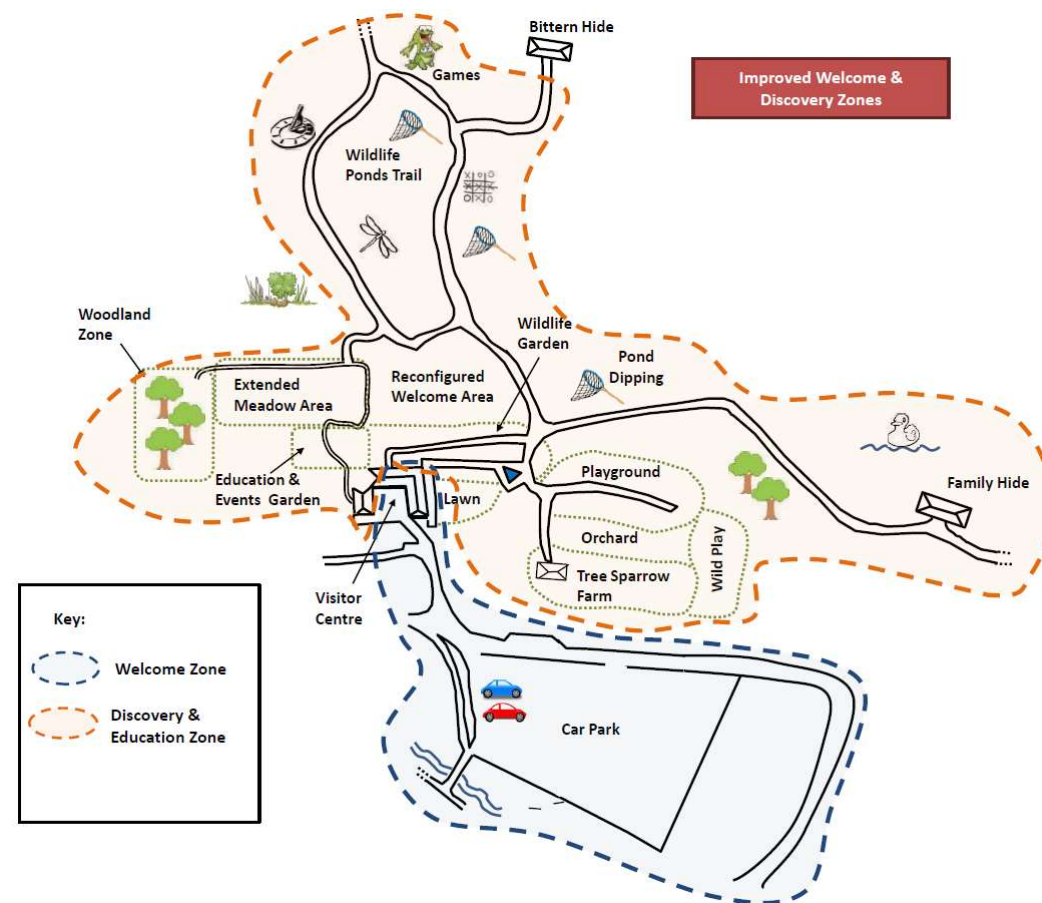
The existing car park is located at the entrance to the Old Moor site, close to the Visitor Centre. The location of the car park is convenient for visitors to Old Moor, Wombwell Ings as well as users of local foot/bridal paths and the Trans Pennine Trail. Proposals will see the car park facilities improved to provide dedicated parking bays, a one-way system, signage and tarmac surface to increase visitor safety and enhance the visitor experience.

In terms of layout, the improvements to the car park will avoid the need for excessive manoeuvring and remove bottlenecks which are problems with the current layout. The new layout will minimise pedestrian and vehicle interaction which, will create a safer and less confusing space for visitors to navigate. A new garden area will be created at the head of the car park on the approach to the Visitor Centre, providing a place for people to gather before entering the site.

3.1.2.3 New Family Hide

The new family hide will be located on the footprint of the existing. Proposals had originally been for the refurbishment of the existing structure, however

Figure 3-3 : Schematic Layout of the Proposed Redesigned Welcome and Discovery Zones



the current condition combined with limitations in achievable layout/accessibility improvements led to the decision to replace the hide with a new structure. The location of the family hide within the Discovery/Education Zone is the closest hide to the play area, providing easy access via the reserve path for children to walk and/or parents to push buggies.

The layout of the proposed hide is designed to provide ample space for children and buggies, including an external porch to the rear of the hide (entrance) and doors sized to allow easy access for all (including buggies and wheelchairs).

3.1.2.4 Discovery zone refurbishment and extension

The Discovery Zone is the first part of the reserve that visitors encounter after leaving the Visitor Centre. The activities and information around this zone are primarily aimed at families but also help other audiences new to the reserve – or any nature reserve - feel comfortable. It is aimed at people with little wildlife experience or knowledge. It is a place for fun and exploration with pond dipping, play, gentle paths and accessible information about wildlife. Three new zones will be created. North to south these are: Explorer Zone, Family Meadow (incorporating existing play area) and Secret Water Zone. Each zone has its own identity, but link fluidly so as to encourage visitors to flow between them.

3.2 Design Solution

3.2.1 Design, Appearance and Concept

Key details of the scheme the four elements of the scheme are as follows:

3.2.2 Habitat Improvement Works

- This element of the scheme involves re-profiling at both the Old Moor and Wombwell Ings sites to improve the ecological output and visitor experience.
- At Wombwell, a wet ditch will be created around the perimeter of the site for the exclusion and subsequent protection from walkers and dogs. Exclusion will greatly improve the number of breeding and feeding birds on the site.
- At Old Moor, habitats will be altered for management in line with current best practice for wetland habitats. This will include the creation of three wader scrapes that can be rotationally managed so that one year in three, each scrape is dried out, a sacrificial crop planted, and the fertility boosted for the following year.
- The new Old Moor habitat design will create a new scrape on the Mere, convert the field pools from lowland wet grassland to wader scrape and refresh and re-profile the existing Wader Scrape. At the same time, a new water input onto the Wader Scrape will be created so that raising water levels isn't dependent upon bringing water via the Mere.
- At Old Moor, Green Lane is somewhat devoid of interest and so removing the high bunds will connect people to the landscape and allow views of the site for the first time.
- Create a circular walk by creating a return path at Green Lane.

Figure 3-6 Red Line Boundary Wombwell Ings

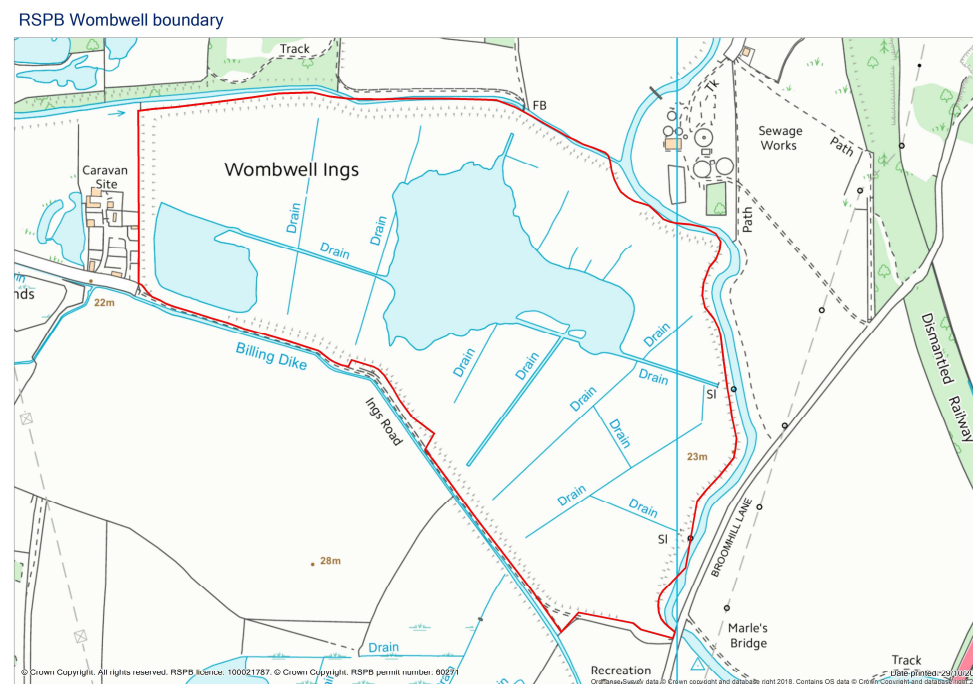


Figure 3-11 Red Line Boundary Old Moor

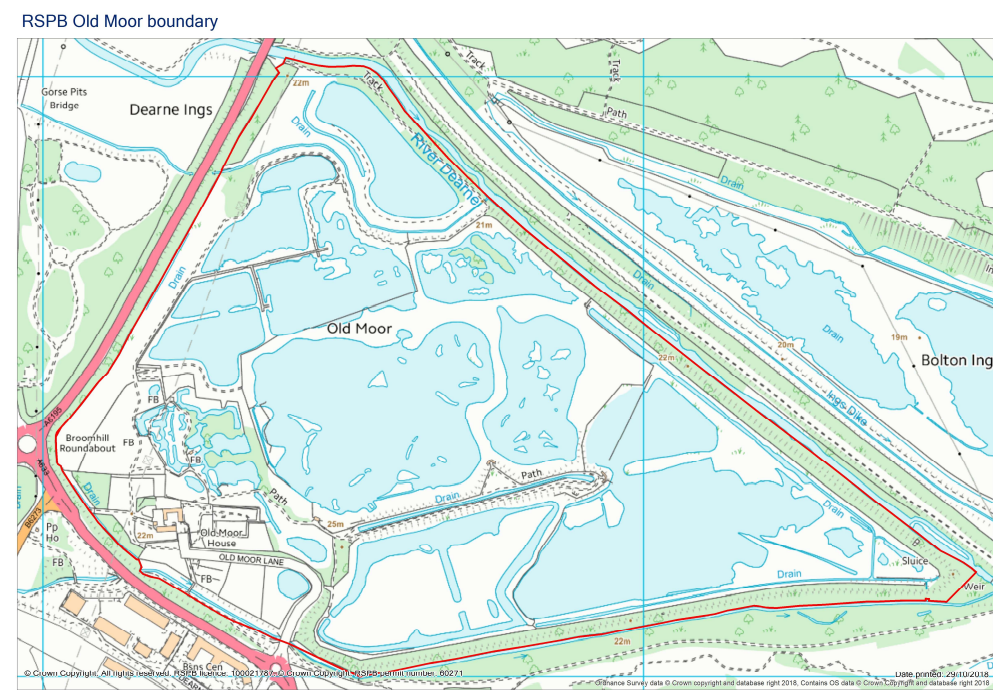


Figure 3-12 Sketch of new Family Hide front elevation

- The Mere at Old Moor, whilst good for breeding gulls and a useful winter wildfowl site, is also ecologically poor around the edges. By creating reedbed along the back edge, this will significantly increase the value to breeding birds such as wildfowl and grebes and allow our bittern population to access the Mere as a feeding resource.
- The Willow pool at Wath Ings already has a good cormorant and little egret roost and with some additional planting of Willows

3.2.3 New car park at Old Moor

- Creation of a permanent surfaced car park and white lined defined to accommodate marked car parking spaces (including Blue Badge holders). The car park will be designed to improve access and manoeuvrability for cars, pedestrians and cyclists to ensure safe and convenient access to facilities.
- Car park improvement works (proposed Oct 2019 - March 2020) will include provision of 112 tarmac surfaced parking spaces (including 6 disabled), coach layby, pedestrian/cyclist paths and landscaping in the eastern area closest to the reserve entrance.
- Areas used by vehicles will have a tarmac surface underlain with a reinforced sub-base to avoid damage.
- A coach drop off space that will accommodate a 52-seater coach is included at the north end of the car park to provide safe and convenient access to the Visitor Centre for the 3,500+ school children who are estimated to arrive at the site by coach each year.
- The redesigned car park provides a safe pedestrian pathway with a clear route to and from the car park to the main entrance of the Visitor Centre to discourage visitors from walking in the road. Bound gravel paths will be 1.2m wide in car park areas increasing as new paths join to 3m on approach to the Visitor Centre courtyard.
- Cyclists enter the site from the bridge in the south-west corner of the car park. They follow a bound gravel path (separated by shrub planting) which widens to allow dismount before the cycle path merges with the pedestrian path on approach to the Visitor Centre.
- Character of landscape by car park to be semi-natural with native plants, whether trees, shrubs or herbaceous material. Depressions within meadow areas to encourage species preferring moist soil conditions, as well as helping to discourage short cuts.

- A new garden area to form a foreground to views of the Visitor Centre as visitors' approach providing a place for people to gather before entering the existing visitor centre gardens.
- The proposed drainage design is to limit discharge to Knoll Beck to the green field flow discussed in Section 2.5.1 of the Old Moor Car Park Flood Risk Assessment. The final car park will consist of four sections arranged in three north to south columns (Drg No 530-T-01 Revision C). Each of the sections will drain to an open drains running west to east across the site. This will drain into a ditch running down the east of the site and discharge into Knoll Beck.
- Water to drain away under gravity (no pumping system) to Knoll Beck.
- Small timber dams with a notch in the base which allow water to flow out at a rate of 5 litres/second/hectare will be installed at the downhill end of each ditch. (Drg No CD-02).
- New holding pond to be created south of the existing pond. Potential to form a marshy reedbed ecosystem. Surface water from car park drains will run into this pond prior to discharge into Knoll Beck.
- The drainage strategy is informed by the Flood Risk Assessment for the car park which is included with the planning application.

3.2.4 Family Hide

- Replacement to the existing family hide sized to accommodate up to 30 school children as part of the sites 'Schools on Reserves' programme.
- The structure forms part of the reserve's Discovery Zone and will need to accommodate activities and the means to teach school children. It will bridge the gap between other discovery zone activities such as the playground and pond dipping and a more traditional birdwatching experience.
- The proposed new hide will be 2.76m at the eaves, 13.4m 6.4m wide & 4.14m to ridge. The floor area will be 50.25 m2. with a rear porch area of 21.84 m2. Total floor area of hide and porch 72.09 m2.
- The hide will have an internal depth of 4.2m and will support a sedum living roof. The hide will incorporate a steel portal frame structure not only to support the living green roof but also add additional wind loading properties.

- Walls will be clad with timber tongue and groove tanalised weather board. Timber will be locally sourced where possible.
- Internal walls lined with plywood and 75mm insulation boards used between exterior and interior walls.
- Extensive glazing to the front and front side angled elevations of the hide will allow sufficient views regardless of a person's height or the sun path. Glazing will be toughened 6mm safety glass. Two internally openable windows (one to each front side angled elevation) will allow hide users to experience the noise of the birds whilst also providing natural ventilation to the hide.
- The structure is accessed by two doors to the rear of the hide which are sized to provide easy access for pushchairs and wheelchairs. An additional children's side door provides inclusive access for younger visitors, reinforcing the fact that the hide is designed for their enjoyment.
- To the rear of the hide is a full width porch providing shelter for visitors entering and leaving the hide, and temporary storage for pushchairs to free up space within the hide. The porch provides a welcoming entrance to the hide from the main reserve path.



Figure 3-14 Sketch of new Family Hide front elevation

3.2.5 Discovery Zone refurbishment and extension

Introduction of three new areas within the Discovery Zone. North to south these will be:

- Explorer Zone:
 - Current 'off limit' thickets, reeds and waterways will be made accessible and safe for children and adults to explore.
 - Thread child-sized paths through the wooded areas, that open into a secret glade with an exciting lookout treehouse.
 - Natural looking sand pool for younger children.
 - Willow dwellings will be scattered across the area to encourage exploration and creative play.
 - New ways of bridging the ponds—stepping stones, a floating rope bridge and a wobbly wooden bridge.
- Family Meadow:
 - Revitalised existing play area, linked to the wider reserve.
 - Management of existing underutilised rough grassland to become attractive meadow area for picnics and provide a link to the pond dipping area.
 - New play elements: Natural looking sand pool, tree trunk for climbing, barefoot trail in the ancient shape of a labyrinth with a variety of sensory materials.
 - Clear child-sized paths through thickets, connecting formal play area with meadow and on to the dipping pond area.
- Secret Water Zone:
 - Creation of a watery playable landscape.
 - Channels with 400mm of water depth will weave round islands.



Figure 3-15 Concept design layout of Old Moor Discovery Zone (for illustrative purpose, full masterplan accompanies the planning application)

- Tunnels and tree trunks bridge the channel providing access to the islands.
- Sluice gate will control depth of water.
- Willow structures in the hillocky area.
- Jetty-like tree house.
- Ribbons of paths through the thickets and a cargo net between oak trees.
- Remodelling of site entrance:
 - To improve the visitor experience at Old Moor, the RSPB will be remodelling the entrance to the reserve.
 - The area to the north of the current visitor centre will be cleared—unused hides taken out, fences taken down and raised beds remodelled.
 - A new route through to the reserve will be created, as well as new outdoor seating for the Education area.

3.3 Construction Phase

3.3.1 Construction timescales and phasing of works

Construction is proposed to be undertaken over a four-year period, commencing in October 2019 and finishing in September 2023. All construction works will be undertaken after 1st August and end before 1st March to avoid bird nesting season and minimise disturbance to wildlife at the reserve.

The table below details the proposed timescales for each element of works at Old Moor and Wombwell Ings.

	Project Year 1				Project Year 2				Project Year 3				Project Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Oct - Dec 2019	Jan - Mar 2020	Apr - Jun 2020	Jul - Sep 2020	Oct - Dec 2020	Jan - Mar 2021	Apr - Jun 2021	Jul - Sep 2021	Oct - Dec 2021	Jan - Mar 2022	Apr - Jun 2022	Jul - Sep 2022	Oct - Dec 2022	Jan - Mar 2023	Apr - Jun 2023	Jul - Sep 2023
VISITOR INFRASTRUCTURE																
Buildings work & built structures																
Visitor Centre, Discovery and Education Zone																
Refurbish activity room																
Upgrade education area into discovery area																
Refurbish the existing playground																
Extension of Play area to include 'Wild Play' area																
New viewing structures and viewpoints																
Install new resting points																
Create new circular walk and resurface existing path																
New viewing structure new hide over mere																
Installing and replacing interpretation and signage at Old Moor and the wider Dearne Valley																
Landscaping and external works																
Car Park																
Resurface and re-profile Old Moor Car Park																
DELIVER HABITAT WORK																
Wombwell																
Intensive survey for Water Vole Activity in September																
Monitor year round for Water Vole Activity																
Botanical survey - carry out in May and again in September ahead of commencement of works in October																
Rotary Ditcher Hire - Used to create ditches and wet features																
Digger and Dumper truck hire - used to move soil to create islands and feeding edges																

	Project Year 1				Project Year 2				Project Year 3				Project Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Oct - Dec 2019	Jan - Mar 2020	Apr - Jun 2020	Jul - Sep 2020	Oct - Dec 2020	Jan - Mar 2021	Apr - Jun 2021	Jul - Sep 2021	Oct - Dec 2021	Jan - Mar 2022	Apr - Jun 2022	Jul - Sep 2022	Oct - Dec 2022	Jan - Mar 2023	Apr - Jun 2023	Jul - Sep 2023
Mobilisation of machinery - cost associated with brining machinery on site																
Predator Fencing on Wombwell and fencing on Dearne Ings																
Gates and pens on Wombwell and Dearne Ings- to control access and grazing																
Re-seeding of Dearne Ings - Establish grass sward so that site can be grazed																
Penstocks and Pipes																
Cattle grid and cover, and fencing for safe working																
Fields Pool																
Intensive survey for Water Vole Activity in September																
Monitor year round for Water Vole Activity																
Botanical survey - carry out in May and again in September ahead of commencement of works in October																
Mobilisation																
Mud moving / re-profiling																
new water input from Knoll Beck to Field Pools via Grn lane																
Penstocks x3																
Gravel substrate																
Internal predator fence																
Mere Reprofiling																
Intensive survey for Water Vole Activity in September																
Monitor year round for Water Vole Activity																
Botanical survey - carry out in May and again in September ahead of commencement of works in October																
Mobilisation																

	Project Year 1				Project Year 2				Project Year 3				Project Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Oct - Dec 2019	Jan - Mar 2020	Apr - Jun 2020	Jul - Sep 2020	Oct - Dec 2020	Jan - Mar 2021	Apr - Jun 2021	Jul - Sep 2021	Oct - Dec 2021	Jan - Mar 2022	Apr - Jun 2022	Jul - Sep 2022	Oct - Dec 2022	Jan - Mar 2023	Apr - Jun 2023	Jul - Sep 2023
Mud moving / reprofiling																
New Penstock to Wader Scrape																
Reed establishment																
Fencing to allow reed establishment																
Tern Rafts																
Cormorant tree																
Osprey Platform																
Wader Scrape																
Intensive survey for Water Vole Activity in September																
Monitor year round for Water Vole Activity																
Botanical survey - carry out in May and again in September ahead of commencement of works in October																
Mobilisation																
Mud moving / re-profiling																
Penstocks, pipe and ditching																

Table 3-2 Proposed construction timescales

3.3.2 Construction Methodology

At the time of submission of the Planning Application RSPB have not yet gone out to tender for contractors to deliver each element of the works (habitat reprofile, family hide, Discovery Zone and car park). The following construction methodology is based on RSPB's required construction methodology and specific design requirements for each element of works. Tender requirements will subsequently be developed based upon the principles below.

3.3.2.1 RSPB Construction Methodology

The following construction method statement is produced by RSPB and will inform the tender documents at the point at which contractors are commissioned for each element of works.

Machinery

No machinery or movement of spoil will take place on public highways, except for the delivery and removal of machinery at the start/end of work phases. Machinery will be delivered to site by than appropriate mean of transport. Machinery will stay on site until all work for that period is completed, minimising the need for additional journeys. There will, therefore, be one drop off and pick up per machine. The machinery will be dropped off at the Old Moor car park and collected from the same point at the end of the works. For Wombwell Ings, the machinery will be dropped off at Broomhill Lane and collected from the same point at the end of the works.

Subject to confirmation by the appointed contractor, we envisage the machinery to be used during the works to include:

- 1 of 360° 15m long reach tracked digger
- 1 of 360° Atlas 4-wheel drive digger
- 2 of 32 tonne dumper trucks for the work on Old Moor

Storage of machinery

Equipment being used on the project will be stored overnight on RSPB Old Moor as the site is secure and gates are locked.

The equipment will be stored in the reserve work compound near the visitor centre. During works at Wombwell Ings, machinery will be driven each day onto the work area via the underpass, and back again. This is outside of the flood reservoir area, but contractors will be subscribed to the Environment Agency flood line to allow warning of any potential flood risk as are site staff. Machinery will be left on hardstanding and a spillage kit will be kept with the machinery.

Timings

Habitat works will be undertaken after 31st August and end before 1st March to avoid nesting birds.

Scrub to be removed prior to 31st March to avoid bird nesting which could go in to September; pre-removal surveys for nesting birds will be undertaken where necessary. Work will only take place between the hours of 8am and 5pm.

Livestock

Where possible, livestock will be excluded from work areas. Temporary fencing will be erected where necessary. For habitat works at Wombwell Ings, RSPB will liaise with the grazer to agree either excluding the horses from the work area or removing them completely from Wombwell Ings for the duration of the work. There is the potential to install a cattle grid to stop horses getting off site.

Infrastructure

A hazard map will be produced for the contractor that will include all potential infrastructure that could be damaged or cause damage. Features such as power lines, bridges, penstocks, pipes and manholes will be clearly marked, and safe working distances enforced. This will form part of our Exchange of Information.

There is an electric pump next to the reservoir on Old Moor that has its own power supply with electricity cables close to the work area. As this pump is no longer used, it is proposed to disconnect the supply to this pump to ensure site safety. Manhole covers on Old Moor (close to the reservoir) will be clearly marked on the hazard map.

There is an overhead powerline on Wombwell Ings so a site visit by Northern Powergrid will be required. We will arrange this in advance of the work to ensure that work is done to their safety guidelines and the safe zone and height is marked accordingly.

Minimising ground damage

Clearly marked out paths will be laid out for machines to follow to reduce damage to soil and flora.

The ditch work at Wombwell Ings will be marked out for the digger and dumper to follow – therefore reducing the area they have to drive on and work will commence on the ditch at the far end of the Wombwell and work gradually back towards the entrance.

RSPB will, as leaseholders, and to protect immediate habitat, add a layer of inert hard core to the track on Dearne Ings and the path to the reservoir to ensure that the ground here is not damaged by repeated journeys.

Tipping into Water

When tipping any spoil into any waterbody, we will only do this work once we have lowered the water level to make the work as safe as possible.

In particular at Wombwell Ings, when working at the reservoir, we will tip the spoil to form a causeway that will create a safe track for the dumper. A 360° digger will regularly level out the causeway and ensure it is stable.

River Banks

A buffer zone of 5 metres will be put in place to ensure diggers and dumpers do not travel too close to the edge.

Works close to river banks will be necessary when installing the water control structure at Wombwell Ings (see methodology for the water control structure installation below for methodology). Elsewhere, a buffer zone of 5 metres will be put in place to ensure diggers and dumpers do not access the edge of the river.

On Dearne Ings, where the track runs alongside the river bank, a marked 5m buffer zone will be strictly enforced along with a 5mph speed limit and the hard-core track will ensure that machinery is kept away from the bank.

Public Access and Public Rights of Way

On Old Moor, we will phase the works. This will mean that the work on Field Pools is done ahead of the work on the Mere, therefore Green Lane path can be kept open during this phase and access to most of the reserve maintained. This will ensure that there is no direct interaction between visitors and works areas or access routes. The work will create a new path parallel to Green Lane so the following year, this can be kept open, allowing the work to take place on the Mere and Green Lane path can be closed.

Wombwell Ings is ringed by a footpath and bridleway. Temporary fencing will be used to keep the public on the footpath and away from the work areas and clear signage (including work's information, CDM and health and safety) will be erected. Clear signage will tell people to access Wombwell via Broomhill Park allowing them to be segregated from the machinery. We will also block access from the path to the main access to funnel people to the recreation ground access. The level crossing will include barriers that guide the public to cross in the middle of the road therefore providing plenty of visibility to machinery drivers as well as the crossing being marshalled.



Figure 3-16 Access arrangements for Wombwell Ings during construction

The hedgerow close to the access on Wombwell Ings and Dearne Ings will be trimmed back to ensure that any public who do disobey the signage and fencing can be easily seen. A five mile per hour speed limit will be enforced in this area. When working on Dearne Ings and the reservoir the following precautions will also be put in place. There is a lay-by on the A6195. Off the lay-by is a path, off the highway that someone could potentially access Dearne Ings. This is not a Public Right of Way. However, to avoid any members of the public straying into the work area by mistake, Dearne Ings itself will be fenced off.

Access to and from Wombwell Ings

At Wombwell Ings, spoil will be tipped on Dearne Ings temporarily to allow quicker transporting, thus reducing the number of days that work will happen on Wombwell and the number of days when public could potentially be in contact with the work. It will also make it easier to manage two dumpers that both need to pass through the underpass. A clear traffic management system will be put in place to ensure only one dumper passes through at once.

Once the ditch is complete, the digger will fill the dumpers on Dearne Ings and they will move the spoil to the reservoir, a task that can be completely segregated from the public.

The following sections outline key construction activities relating to each element of works. Tender documents will be produced at an appropriate point in project progression providing detailed methodology for the appointed contractor, and in line with the RSPB methodology outlined above.

3.3.2.2 Habitat Improvement Works - Wombwell Ings

Habitat reprofiling works at Wombwell Ings are scheduled to commence in October 2020 and conclude in March 2021, thereby avoiding bird nesting season.

Installation of a water control structures

- This sluice will be installed to Industry Standard Methods, and as agreed by the Environment Agency.
- The footpath is likely to be closed for two days, and permission from BMBC PRoW will be sought.

- The work will only be undertaken if conditions on the river are suitable. Water levels will be monitored to ensure a window of four days for the work, taking in a degree of contingency.
- A pipe will be laid on the inside half of the bank first and a penstock fitted to stop water coming in. The second half will then be installed and fitted.
- Any water control structure on River Dove will be approved by the Environment Agency and will meet eel and fish regulations.

Creation of additional habitat features

- Creation of some island habitat with spoil removed whilst creating the ditch.
- The soil will be tipped only once the water level has been lowered to make the work as safe as possible.
- On the reservoir, the tipping of the spoil will form a causeway to form a safe track for the dumper. A 360° digger will regularly level out the causeway and ensure it is stable.

Creation of a site perimeter ditch with associated predator fence

- Expected to be cut by the appropriate methods as will be outlined to us by the contractor and work to Industry Standard methods
- Any excess soil will be moved to the Old Moor reservoir by transporting the soil by dumper from Wombwell, via the track that goes along the underpass between Wombwell and Old Moor.
- Spoil will be tipped on Dearne Ings temporarily to allow quicker transporting, therefore reducing the number of days that work will happen on Wombwell and thus the number of days when public could potentially be in contact with the work. It will also make it easier to manage two dumpers that both need to pass through the underpass. A clear traffic management system will be put in place to ensure only one dumper passes through at once.
- Once the ditch is complete, the digger will fill the dumpers on Dearne Ings and they will move the spoil to the reservoir, a task that can be completely segregated from the public.

3.3.2.3 Habitat Improvement Works - Old Moor

Habitat improvement works are scheduled to commence October 2021 and commence March 2023. Works will be phased to minimise disturbance to wildlife and visitors. No construction works will be undertaken in bird nesting season, thereby construction will only commence between October and March each year.

- Re-profile some of the banks on the Mere creating a gentler slope into the water. We will do this by lowering the banks of the Mere and push the soil into the water to create softer shallower edges
- Create a perimeter ditch and fence. We will 'lose' the spoil created by doing this to make three compartments on the Mere by creating islands from the spoil.
- We will create an island for the heronry, and the spoil will also go into the Mere to create the soft shallow edges
- The water levels will be lowered to make the work accessible and for working in a safer environment
- Create a circular walk by creating a return path at Green Lane.

3.3.2.4 New car park at Old Moor

Works to improve car parking facilities are proposed to be undertaken during a 12 week period from October 2019 to March 2020. The planning application includes both phases of works.

- Works will be undertaken in three sub-phases A-C. Phases are illustrated on drawings 530-09, 10 and 11 which accompany the planning application. For each sub-phase the following construction activities will be undertaken:
 - Security fence erected. Clearance of vegetation and grubbing up roots.
 - Construction signage, construction access road and contractors compound for storage to be set up and adjusted for each sub-phase.
 - Setting out works.
 - Cut and fill and general earthworks including ditch/swale.
 - Grading to specified falls.
 - Construction of culverts.
 - Laying of Type 1 sub-base.
 - Fixing kerbs and edgings.
 - Construction of fence.
 - Laying macadam surface.
- Macadam surface on site access road will be the last activity to be undertaken upon completion of sub-phases A-C.
- Removal of signage and security fence upon works completion. Hard core laid within the site compound will remain, providing overspill parking.

Construction Access

- Construction access routes during the three sub-phases are shown on Drg 530-9, 10 and 11. The sub-phasing of works will ensure vehicle, cycle and pedestrian access to and around the site is adequately maintained during construction.
- Construction traffic to use first access point on left, so that least chance of construction traffic near visitors, either in vehicles or walking.
- Access for delivery vehicles maintained for almost all of contract period.
- Only actual construction works will be in route of delivery vehicles or emergency vehicles in Phase C, for which special provision will be made.
- Pedestrians will be diverted away from construction works as necessary along routes shown on Drg 530-9, 10 and 11.

3.3.2.5 Family Hide

Construction of the family hide will be undertaken between October 2019 and end March 2020. Works will include the following key construction activities.

- Erection of site fencing and signage to separate site users from construction site.

- Dismantle the existing hide. Removal of materials from site.
- Pouring of concrete foundation pad.
- Erection of steel super structure.
- The timber hide is sectional and will be transported to site in sectional form on a truck and trailer. Site construction of the timber hide is anticipated to take approximately four days.
- Fitting of the timber sections to the steel super structure.
- Installation of toughened glass to facades.
- Establishment of sedum roof.

Construction Access

- Construction vehicles will be a truck and trailer and a van. No other construction machinery is anticipated for the construction of the hide.
- Access to the hide location will be via the main reserve entrance, through the reserve works yard. Vehicles will be limited to travel at 5 mph on the site.
- Movement of equipment on the site to the hide location will be done wherever possible out of operational site hours. Where necessary, temporary closure of the Old Moor site to the public will be undertaken to ensure safety of all site users during construction.
- Equipment and vehicles will be stored overnight in the Old Moor reserve works compound, near the Visitor Centre.

3.3.2.6 Discovery Zone refurbishment and extension

Work will be conducted on site from October 2019 through to March 2020 —so avoiding doing any noisy or earth work activity during the nesting season which begins in the Spring. The playable landscape will be completed at the end of March 2020, but areas will need reseeding with meadow grass and planting up with willows and reeds. The area will be ready for playing on in the 2020 summer holidays. The following construction activities will be undertaken for each of the three zones:

Explorer Zone

- Clear narrow pathways into the central point of the 'island'.
- Make a clearing and erect a tall timber lookout structure, with bark chipping safety surface.
- Erect the two new bridges across the ponds.
- Create barefoot trail labyrinth filled with variety of sensory materials.
- Access to any deep water prevented by leaving thick scrub and where this is not sufficient, installing brash fencing or using hedge laying techniques

- Paths to be formed naturally by footfall.

Family Meadow Zone

- Adjust/remove some of the items in the existing play area.
- Rangers and volunteer team to repaint existing structures and in some areas add planting across play area, giving the impression that the structures arise from the undergrowth whilst preserving a safe fall area.
- Link existing play area to meadow area and dipping platforms and lake beyond by removing a 4-5m wide section of trees that create the border between.
- Clear child-sized paths routes through the thicket.
- Build large sand pool, mounds and fingers (approx. 9x6m) with tree trunk logs to play on.
- Mow the meadow on both sides of path, create areas for sitting and picnicking.

Secret Water Zone

- Create water and mud play, by repurposing the existing overflow channel between the large pond to the north and the smaller pond at far south of the site.
- Fit penfold sluice at top to allow filling with water and at the and bottom to control depth.
- Water play area will be sculpted by excavator to create a network of mounds, pools and channels with a concrete tunnel, two tree trunk bridge crossings, boulders and stepping stones.
- Base of channels to be compacted hardcore base, lined with pond-lining layer topped with 200mm pea gravel to create firm base for channel bottom. Sides defined by variety of natural edgings, timber, boulders, sawn posts.
- On western bank entry points will be defined by gaps created in trees and shrubs.
- A jetty treehouse will be created to give another entrance to the channels. The woodland in this area will be managed to create a network of paths and clearings.
- The timber and wire fence between the formal play area and the woodland to be removed. Openings created through to the teasel field.
- A brash fence to be created to edge Secret Water to ensure children do not enter the pond at the south of the site here. The brash fence to run from the teasel field and orchard corner, through the teasel field, along the southern pond and connecting to the main path on western edge of Secret Water.
- A willow dwelling created between the new mounds and hillocks on the eastern side.

Remodelling Reserve Entrance

- Clear the existing hides and transform the concrete foundations into attractive seating areas.
- Clear the hedges and trees required to create a route and sightlines through to the reserve.
- Creation of new 80m reserve path.

- Various planting and garden design in front of centre.
- Source from site 35 log rounds to create education area. Alternatively reuse the lumber from the planters that will be dismantled to create benches.

Construction Access

- Access to the discovery zone locations will be via the main reserve entrance, through the reserve works yard. Vehicles will be limited to travel at 5 mph on the site.
- Movement of equipment on the site to the hide location will be done wherever possible out of operational site hours. Where necessary, temporary closure of the Old Moor site to the public will be undertaken to ensure safety of all site users during construction.
- Equipment and vehicles will be stored overnight in the Old Moor reserve works compound, near the Visitor Centre.

3.3.2.7 Ecological Considerations and Mitigation during Construction

An Ecological Impact Assessment (EclA) has been undertaken to assess the impact of the proposed development (and construction of) on the Old Moor and Wombwell Ings sites. The EclA concluded that, subject to implementation of the recommended mitigation, compensation and enhancement measures, the proposed development would not have a negative impact on the ecological value of the site and neighbouring areas. The EclA recommended a number of mitigation measures which should be undertaken during construction. These measures are described in section 5.3. The recommendations will be integral to the tender requirements during the works contractor procurement process when undertaken. RSPB will be responsible for overseeing ecological mitigation measures during construction to ensure that the requirements of the EclA relating to construction site practice are fully implemented by the contractor.

4 Planning Policy Context

4.1 Background

The proposed scheme lies within the administrative boundary of Barnsley Metropolitan Borough Council. The following national and local planning policy is relevant to the proposed scheme.

4.2 National Planning Policy Framework

The relevant national planning policy for Barnsley Metropolitan Borough Council is the National Planning Policy Framework (NPPF). The revised NPPF was published on 24th July 2018 and replaces the previous NPPF published in March 2012.

The existing NPPF document is divided into a series of themes relating to delivering sustainable development. The themes considered to be most relevance to the proposed scheme are set out below:

The Presumption in Favour of Sustainable Development (paragraph 11) requires Local Planning Authorities (LPA's) to positively seek opportunities to "be sufficiently flexible to adapt to rapid change".

Meeting the Challenges of Climate Change, Flooding and Coastal Change (paragraph 149) states that Local Planning Authorities (LPAs) "should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperature".

Planning for Flood Risk (paragraph 155) states that where development occurs in areas at risk from flooding, measures should be undertaken to ensure that "the development should be made safe for its lifetime without increasing flood risk elsewhere".

4.3 National Planning Practice Guidance

The NPPF is accompanied by National Planning Practice Guidance (PPG). Whilst the NPPF outlines national planning policies that should be considered in determining planning applications, the PPG provides guidance to applicants and LPAs in terms of preparing and determining planning applications. The PPG documents have been updated where appropriate following the publication of the revised NPPF on 24th July 2018.

4.4 Local Planning - Current and Future Direction

Since the introduction of the National Planning Policy Framework, Local Authorities are charged with writing a single Development Plan, known as the Local Plan. The Local Plan sets out the level of growth which needs to be planned in the Barnsley area and identifies where that growth should be located and how it should be delivered. The Plan sets out the planning policies which the Council will use to determine planning applications in the Barnsley area.

The new Local Plan for Barnsley is currently under development which will replace the Core Strategy and the Unitary Development Plan, covering the period to 2033. Once adopted the new Local Plan, together with the Joint Waste plan prepared with Doncaster and Rotherham (adopted March 2012) will form the Statutory Development Plan

for Barnsley. The new Local Plan was submitted to the Secretary of State in December 2016. A consultation on proposed changes to the plan (Main Modifications) following Examination in Public was undertaken July-August 2018. The timescale for adoption of the new Local Plan is yet to be confirmed, however it is anticipated for late 2018.

Until the point at which the new Local Plan is adopted, current planning policy for Barnsley is the Core Strategy and saved policies contained within the Unitary Development Plan. The Core Strategy sets out the Council's overall approach to development and the key policies that it (and others) uses when considering individual planning proposals. The Core Strategy was formally adopted by the Council in September 2011. It covers the period to 2026. The Unitary Development Plan was adopted in December 2000. Some policies were saved under a direction from the Secretary of State in September 2007. Saved policies within the UDP together with policies within the Core Strategy which are relevant to the RSPB Dearne Valley scheme are material in decisions to planning. These policies are discussed in more detail below together with their applicability to the planning application.

Alongside the Core Strategy, Barnsley Metropolitan Borough Council has several Supplementary Planning Documents (SPDs) which provide advice on issues pertaining to planning, and are material in decision making by the council, alongside the Core Strategy. The Trees and Hedgerows SPD is of relevance to the proposed development at Old Moor.

4.5 Barnsley Core Strategy 2011-2026

The Core Strategy sets out the Council's overall approach to development and the key policies that it (and others) uses when considering individual planning proposals. The Core Strategy constitutes current planning policy for Barnsley and will be material in decisions relating to planning decisions until the point at which the new Local Plan is adopted (anticipated late 2018). The Core Strategy sections, specific policies and accompanying Supplementary Planning Documents (SPDs) that are of relevance to the proposed scheme are set out below:

Core Strategy Policy Reference and Title	Policy Requirements	How the development proposals at RSPB Dearne Valley respond to the planning policy requirements
CSP 1 Climate Change	States that the council will take action to adapt to climate change by locating and designing development to reduce the risk of flooding, promoting the use of sustainable drainage systems, and promoting investment in Green Infrastructure to promote and encourage biodiversity gain.	The intention of the "Giving Nature a Home in the Dearne" scheme is to promote investment in Green Infrastructure to encourage both biodiversity gain and improve visitor experience. The four projects for which planning permission is sought are intended to facilitate invest in the ecology, infrastructure and visitor experience of the Dearne Valley reserves, specifically RSPB Old Moor and Wombwell Ings. Flood Risk Assessments undertaken demonstrate that proposals will not impact on the flood attenuation capacity of Old Moor and Wombwell Ings sites. The FRA for the Old Moor car park acknowledges that climate change will likely increase the flow in Knoll Beck and bring forward the limit when gravity outflow from the site cannot take place. In response, the car park drainage strategy takes into account the impact of climate change when designing the size of the balancing capacity.
CSP 2 Sustainable Construction Development	Requires new developments to demonstrate how it minimises resource and energy consumption, compared to the minimum target under current Building Regulations legislation, and how it is located and designed to withstand the longer-term impacts of climate change.	The Family Hide is designed to minimise resource and energy consumption during construction and operation. The structure is designed to be predominantly pre-fabricated, thereby reducing on site construction waste and energy consumption. The hide is naturally ventilated and includes minimal services resulting in minimal energy consumption during operation. Timber will be sourced locally where possible to minimise carbon emissions associated with transport of materials. The Family Hide has a sedum roof affording resilience to the impacts of climate change including insulation (minimise heat gain/loss), and surface water attenuation (reduce run off rates and flood risk). Flood Risk Assessments have been undertaken for Wombwell Ings, Old Moor, and the proposed car park alterations at Old Moor to ensure that there is no additional flood risk because of the changes to the site.
CSP 3 Sustainable Drainage Systems (SuDS)	States that all development will be expected to use Sustainable drainage systems (SuDS). Only in exceptional circumstances, where it can be demonstrated that all types of SuDS	The proposed car park drainage design is to limit discharge to Knoll Beck to the green field flow (Section 2.5.1 of the Old Moor Car Park FRA). In the drainage design, zero infiltration has been assumed with all excess water being stored on site in drainage ditches and then the holding pond, prior to discharge into Knoll Beck at a rate not

Core Strategy Policy Reference and Title	Policy Requirements	How the development proposals at RSPB Dearne Valley respond to the planning policy requirements
	are impractical, will other drainage management systems be permitted. Planning applications must include an assessment to show that SuDS will work and be maintained. Measures should be taken to avoid water contamination and safeguard groundwater supply. Developers will be required to contribute to the maintenance of SuDS.	exceeding 5 litres/second/hectare.
CSP 4 Flood Risk	Aims to reduce the extent and impact of flooding by requiring site-specific Flood Risk Assessments (FRAs) for proposals over 1 hectare in Flood Zone 1 and all proposals in Flood Zones 2 and 3. It also requires the use of SuDS (in accordance with policy CSP 3) and the use of flood resilient design in areas of high flood risk.	Both Old Moor and Wombwell Ings sites are located within Flood Zone 3 but the wetland improvement scheme (habitat reprofiling) is defined as a water-compatible use under the NPPF. Proposed works at Wombwell Ings will not affect the functioning of the controlled washlands, therefore the design cannot increase flood risk elsewhere. Old Moor currently operates as a flood attenuation basin. the frequency and mechanism of flooding from the rivers remains unaffected by the proposed works. Flood embankment levels are not altered as part of the landscaping works and all overflow levels remain unchanged.
CSP 20 Promoting Tourism and encouraging Cultural Provision	Commits to the promotion of tourism by promoting the existing cultural provision and tourism offer and encouraging the growth of the tourism business sector. Tourist related development in rural areas will be protected and encouraged to support and diversify the local economy, subject to the requirements of Policy CSP 21 Rural Economy.	The "Giving Nature a Home in the Dearne" programme invests in the ecology, infrastructure and visitor experience of the Dearne Valley reserves, specifically RSPB Old Moor and Wombwell Ings. The proposed works at Old Moor and Wombwell Ings are intended to enhance the visitor experience and attract more visitors to the sites and local area.
CSP 21 Rural Economy	States that a viable rural economy will be encouraged by allowing development which is related to tourism or recreation, and development which improves the range and quality of local services in existing settlements. Developments in rural areas will be expected to not have a harmful impact on the countryside, biodiversity, Green Belt,	The proposed works at Old Moor and Wombwell Ings are intended to improve the visitor experience as well as enhancing biodiversity and attracting more breeding and feeding birds to the site. As such, designs for all four elements (habitat improvement, family hide, new Old Moor car park and discovery zone refurbishment and extension) are all designed to have minimal impact on the natural environment and enhance it where possible. This is achieved through concepts such as: • Reprofiling of habitats in line with evidence-based research to allow rotation of cells and consequential habitat recovery.

Core Strategy Policy Reference and Title	Policy Requirements	How the development proposals at RSPB Dearne Valley respond to the planning policy requirements
	landscape or local character. Developments should consider the re-use of existing rural buildings in the first instance.	• Use of natural, local materials within the new wild play area. • Landscaping to the car park/welcome area to screen built infrastructure, provide shade, surface water attenuation and biodiversity value. • Sedum roof to the new Family Hide to enhance biodiversity and provide new habitats for flora and fauna. Original proposals sought to refurbish the existing family hide. The existing hide was subsequently found to be in a poor state of repair and ill-suited to the intended use, thereby requiring replacement with a new structure. The new structure will be predominantly fabricated off site, thereby minimising construction impacts and disturbance to visitors and wildlife on the Old Moor site.
CSP 23 Accessibility Priorities	States that transportation investment will be focused on the priorities including the facilitation of sustainable links between the Principle Towns and existing and proposed employment, community and leisure and tourism facilities in the borough.	The redesign and replacement of the existing car park at Old Moor is designed to facilitate visitor access to the site by providing ample safe and convenient parking for the estimated 100,000 annual visitors to the Dearne reserves. Car park improvements will include an improved link to the Trans Pennine Trail, facilitating access by those travelling by bike.
CSP 29 Design	Requires high quality design which takes advantage of and enhances the distinctive features of Barnsley, including topography, Green Infrastructure assets, important habitats, woodlands and other natural features. Also views and vistas to key buildings, landmarks, skylines and gateways. The policy states that development should contribute to place making and be of a high quality, that contributes to a healthy, safe and sustainable environment. Also, enable all people to gain access safely and conveniently, providing, in particular, for	The design of each of the four elements of proposed works at Old Moor and Wombwell Ings is intended to complement and improve on the existing topography and green infrastructure with the primary aim of improving habitats and enhancing biodiversity on the sites. Access for all is a key consideration in design. The Family Hide is designed with wide doors, accessible internal floor space and a porch area to facilitate family and disabled visitors. The car park layout prioritises pedestrians and cyclists providing clearly signed, safe access from car park to Visitor Centre. A coach drop off point close to the Visitor Centre entrance allows safe access by parties arriving by coach.

Core Strategy Policy Reference and Title	Policy Requirements	How the development proposals at RSPB Dearne Valley respond to the planning policy requirements
	the needs of families and children, and of disabled people and older people.	
CSP 33 Green Infrastructure	We will protect, maintain, enhance and create an integrated network of connected and multi-functional Green Infrastructure assets that: • provides attractive environments where people want to live, work, learn, play, visit and invest • meets the environmental, social and economic needs of communities across the borough • and the wider City Regions • enhances the quality of life for present and future residents and visitors • helps to meet the challenge of climate change • enhances biodiversity and landscape character • improves opportunities for recreation and tourism • respects local distinctiveness and historical and cultural heritage • maximises potential economic and social benefits Barnsley's Green Infrastructure network includes River Dearne Valley Corridor, River Dove Valley Corridor and the Dearne Valley Green Heart Corridor.	The Old Moor and Wombwell Ings sites form part of the River Dearne and Dove Valley Corridors and the Dearne Valley Green Heart Corridor. The proposed works are designed to enhance the functional Green Infrastructure, creating new habitats and safeguarding existing ones for generations to come.
CSP 36 Biodiversity and Geodiversity	Development will be expected to conserve and enhance the biodiversity and geological	The proposed works at Old Moor and Wombwell Ings fulfil this policy requirement in their intent; to improve the habitat to encourage wildlife to the sites. Each of the four scheme elements have been designed with consideration for the form, local character and

Core Strategy Policy Reference and Title	Policy Requirements	How the development proposals at RSPB Dearne Valley respond to the planning policy requirements
	features of the borough by: - protecting and improving habitats, species, sites of ecological value and sites of geological value with particular regard to designated wildlife and geological sites of international, national and local significance, ancient woodland and species and habitats of principal importance identified in Section 74 of the Countryside and Rights of Way Act 2000 and in the Barnsley Biodiversity Action Plan. - maximising biodiversity and geodiversity opportunities in and around new developments - conserving and enhancing the form, local character and distinctiveness of the river corridors of the Dearne and Dove as natural floodplains and important strategic wildlife corridors	distinctiveness of the Dove and Dearne river corridors. Examples of this include the use of local, natural materials, creation of new habitats for locally important bird species, and the development of wader cells to allow rotational use and thereby recovery of habitats annually. An Ecological Impact Assessment (EclA) has been undertaken to assess the impacts on site/nearby ecology. The mitigation measures within the EclA will be implemented prior to/during construction, thereby ensuring that there are no negative ecological impacts as a result of the proposed development.
CSP 37 Landscape Character	Development will be expected to retain and enhance the character and distinctiveness of the individual Landscape Character Area in which it is located (as set out in the Landscape Character Assessment of Barnsley Borough 2002).	Each of the four scheme elements have been designed with consideration for the form, local character and distinctiveness of the Dove and Dearne river corridors. Examples of this include the use of local, natural materials, creation of new habitats for locally important bird species, and the development of wader cells to allow rotational use and thereby recovery of habitats annually.
CPS 42 Infrastructure and Planning Obligations	Development must be supported by appropriate physical, social and economic infrastructure	The proposed works at Old Moor and Wombwell Ings are designed to improve the visitor experience. The reserves have demonstrated their importance to the local visitor economy in attracting c100,000 visitors annually. A primary objective of the proposed scheme is to ensure that the infrastructure is in place to facilitate an excellent visitor experience. This includes improves access and parking (new car park design and improved access arrangements) and provision of new facilities for families (wild play area and family hide).

Core Strategy Policy Reference and Title	Policy Requirements	How the development proposals at RSPB Dearne Valley respond to the planning policy requirements
CSP 43 Educational Facilities and Community Uses	The provision of educational facilities and other community facilities will be supported.	The scheme seeks to provide enhanced educational facilities for visitors. This is evident in plans to enhance the Discovery and Education Zone and improvements to habitats at Wombwell Ings allowing visitors the opportunity to see and learn about a variety of bird species.
Trees and Hedgerows SPD	Offers guidance on how to deal with existing trees and hedgerows on development sites.	The works areas are largely devoid of trees except for a group of Willows that are in proximity to the proposed re-profiling at Wader Scrape at Old Moor. These are located outside of the works and situated behind a post and wire fence and a drainage ditch. Due to this they are highly unlikely to be impacted by the works (refer to letter from arboricultural contractor which accompanies this application). Prior to construction commencement, the hedgerows identified as likely to be impacted by the development (EcIA) will be subject to a Hedgerow Regulations Assessment and a Hedgerow Survey Handbook assessment. The results of these assessments will be used to design a suitable mitigation and compensation plan for any loss. These include the hedgerow in the Overflow Car Park and in the vicinity of Green Lane/Field Pools East areas. For hedgerows within construction areas (Green Lane/Field Pools East), an appropriately qualified arboricultural contractor will be appointed prior to advice on an appropriate root protection plan and/or safe excavation measures.

5 Planning and Material Considerations

The following sections describe the planning and material considerations and environmental topics considered during the design of the works, the potential impacts, key issues and the methods to mitigate any such impacts.

5.1 Drainage, Hydrology and Flood Risk

5.1.1 Old Moor

A Flood Risk Assessment (FRA) has been undertaken for the Old Moor site. The FRA provides the following conclusions.

The reserve currently acts as a flood attenuation basin. It should be noted that the frequency and mechanism of flooding from the rivers remains unaffected by the proposed works. Flood embankment levels are not altered as part of the landscaping works and all overflow levels remain unchanged.

Landscaping works primarily involve reprofiling the various ponds within the reserve to improve habitat potential and interconnectivity.

The available one dimensional model has been used to develop flood outlines across the Old Moor Nature Reserve for a range of flood events. Flood extents are based on extrapolation of river levels rather than based on any fully integrated modelling of floodplain flows.

In order to develop a clearer understanding of flow interactions, a new JFlow model has been developed with the aim of reducing uncertainty. Again, inflow hydrographs and outflows remain unchanged. This improved mapping is based on more accurately defined profiles. LiDAR mapping was used to provide a greater level of detail than previously modelled.

Comparative JFlow flood maps have been developed for both the existing baseline and proposed landscaped scenarios. The results from the JFlow modelling are presented as a series of flood maps.

The site is within Flood Zone 3 but the wetland improvement scheme is defined as a water-compatible use under the NPPF.

The nature reserve acts as a significant flood alleviation basin during the 1% AEP event. The corresponding water level for each basin (corresponding to both the baseline and landscaped scenarios) are provided as Figures 4-6 and 4-7.

Modelling constraints mean that a qualitative review only can be undertaken.

- Design inflow into the reserve has not increased as a result of the landscaping proposals. Proposals will not impede the flow of flood water.
- The frequency of inundation remains the same as flood embankment levels and outfall configurations remain unchanged.
- The available volume of flood storage within the nature reserve remains the same as the net cut and fill is balanced. There is no net loss of flood storage
- Despite improved connectivity between ponds, variations in design water level/depths for both the baseline and landscaped scenarios are fairly limited.
- The nominally shallower depth of water (following landscaping) at the outfalls within the south eastern pond represents a slight reduction in peak discharge through flapped outfalls back into the Dearne. The driving head with the nature reservoir is reduced by 0.08m. On this basis there is no increase in flood risk elsewhere.

- Landscaping measures will not alter the operational function of the flood storage basin and does not pose an increase risk to visitors (the site will be closed during significant flood events).
- It is envisaged that water levels within ponds will be drawn down in sequence during 'construction' in order to enable excavation and landscaping to be completed as far as reasonably practical in the dry.

5.1.2 Wombwell Ings

A Flood Risk Assessment (FRA) has been undertaken for the Wombwell Ings site. The FRA provides the following conclusions.

The site is within Flood Zone 3 but the wetland improvement scheme is defined as a water-compatible use under the NPPF. The scheme was required under NPPF to meet the following tests:

- remain operational and safe for users in times of flood,
- result in no net loss of flood storage,
- not impede water flows; and
- not increase flood risk elsewhere

And not affect the functioning of the control washland. This was achieved through the following features of the design:

- The structures require no active management during high flow events ensuring that site personnel remain safe.
- The intake structure will automatically close when the wet ditch is full, so it will not allow flood waters into the site ensuring the functioning of the control washlands will not be affected
- Excavating the wet ditch will increase floodplain storage
- The disposal method for excavated material will not decrease floodplain storage
- The design will not affect the functioning of the controlled washlands, therefore the design cannot increase flood risk elsewhere.

5.1.3 Old Moor Car Park

A Flood Risk Assessment (FRA) has been undertaken for the Old Moor Car Park. The FRA provides the following conclusions.

- The development is compatible with the Flood Risk Zone. The proposed car park sits within the footprint of the existing car park which is within flood zone 3.
- There is no significant additional flood risk outside of the site from the change in use of the site.
- The small loss of flood capacity caused by this development will only have effect after the Knoll Beck Flood Bank is overtopped. It will then have a negligible effect on water levels
- Emergency Planning procedures (as advised in Section 12 of the Car Park FRA) should be carried out.

- The effects of climate change will increase the flow in Knoll Beck and bring forward the limit when gravity outflow from the site cannot take place. The effects of climate change has been taken into account in designing the size the balancing capacity.

5.2 Archaeology and Heritage

5.2.1 Old Moor

5.2.1.1 Archaeology and Heritage Baseline

An initial appraisal of the archaeological and heritage baseline conditions has been undertaken for the site and immediate surroundings. Online heritage data sets have been searched for a 1km radius from the approximate centre of Wath Ings (SE 4306 0225) including:

- National Heritage List for England (NHLE);
- National Record of the Historic Environment (NRHE); and
- South Yorkshire Historic Environment Record (HER).

The online HER does not hold any records for the study area. It should be noted that online data sources do not always contain all records and therefore additional records may be found as a result of formal data searches.

There is one Listed Building within the study area. This is the Grade II Listed Wet Moor bridge (NHLE1286501) located to the south of the development area. The building is sufficiently distant that its setting will not be affected by the development.

There are two non-designated heritage assets recorded on the NRHE. The Wath Upon Dearne Main Colliery (NRHE765361) was located to the south-east of the Old Moor nature reserve. The colliery was largely established and constructed between the 1870s and 1930s, but following its closure in 1986-7 the buildings were demolished.

The other recorded asset is the location of several probable enclosures of uncertain date recorded on aerial photographs (NRHE1025528). The enclosures are located to the north-east of the Old Moor nature reserve near Carr Head Lane. This area was subsequently used for depositing colliery waste in the 1970s and 1980s and therefore the asset may have been removed during this stage or subsequent reclamation.

The earliest mapping reviewed was the 1854 Ordnance Survey plan. The OS map depicts the site of RSPB Old Moor as agricultural fields, although some areas of the site are noted as subject to floods. The area is bounded by the London, Midland and Scottish railway to the north-east, Broomhill Lane to the west (leading to an intersection the railway at the north) and Mexborough and Barnsley branch railway line to the south. Old Moor Farm is located in the south-west of the area and Bulling Dike and the River Dearne are located in the north of the site. There were no significant changes to the site area on the 1893 or 1905 OS maps.

By 1938 a number of the field boundaries within the central area of the site had been removed. Although the subsidence of the Wath Ings was reported to have occurred in the 1930s creating wetland habitat in this area there was no depiction of this on the Ordnance Survey mapping. By 1956 there were few changes on the OS map, but the area of Wath Ings in the south east of the site was depicted as marshy, wet land.

By 1967 several ponds were shown in the south-east of the site at Wath Ings. The embankments in this area had not been modified. Across the remainder of the site the former field boundaries had been almost entirely removed and a number of internal tracks or roadways created within the main part of the site on a regular arrangement. The land to the north of Bulling Dike and the River Deane remained undeveloped and sub-divided into fields.

By 1980 the arrangement of ponds in the south and south-east of the site had been modified with the larger pond becoming more elongated along the southern boundary and several smaller ponds becoming established in the south-east corner.

The works to create Old Moor nature reserve were undertaken through the 1990s. The first stage was the construction of the A6195 which formed the western boundary to the site, completed in 1995. Works on the remainder of the site commenced in 1995 with the removal of the contaminated material from the coal stocking area and creation of the smaller ponds and channels in the area around the visitor centre. The majority of the rest of the excavation took place between 1995 and 1997 with material taken off site to the former Wath Manvers Colliery site to be used in land reclamation there. All of the excavations were completed by the end of 1997 and following the flooding of areas, habitat planting and works to public areas the reserve was formally opened in August 1999.

5.2.1.2 Archaeology and Heritage Potential Impacts and Recommendations

The majority of the Old Moor Nature Reserve site has been subject to extensive excavation, ground works and remodelling such that any archaeological remains are considered highly likely to have been truncated and removed during the works. The following development areas are located within these areas of Old Moor and no further archaeological assessment or mitigation is recommended for these development options:

- Reedbed on the Mere;
- New wader habitat on the Mere;
- Pool on Green Lane;
- Improved water control on the wader scrape;
- Reprofilling the wader scrape;
- Reprofilling the field pools; and
- Green Lane circular walk.

The excavation associated with the creation of the Willow Pool heronry is located on the north-western bank of the northern pool at Wath Ings. The area of Wath Ings was not subject to extensive excavation and remodelling as part of the creation of RSPB Old Moor, although the area has been largely under water since at least the 1960s and certainly waterlogged and marshy land from the 1930s. The northernmost pool within the Wath Ings area is not shown on the OS mapping of 1980 and 1989 and therefore is anticipated to have been created as part of the establishment of the nature reserve in the 1990s. The excavations in this area may not have been as extensive as across the remainder of the site as features such as the former flood bank aligned in a north-east to south-west direction is partially retained within the pool. There is potential that the excavation to create the island of willows may therefore affect ground which has not been previously heavily disturbed. The area for excavation is anticipated to be approximately 0.2 hectares, but this will be subject to detailed design.

Although the location of the works is within an area which may not have been previously truncated there is little evidence to suggest that there will be previously unrecorded archaeological remains present. There is very limited evidence for archaeological remains from any period in the immediate surroundings. Due to the limited nature of the groundworks required for this option and the low potential for archaeological remains it is recommended that no further archaeological assessment or mitigation is undertaken for this development option. Consultation was initiated with South Yorkshire Archaeology Service to obtain pre-application advice on this approach. No response had been received by the time of the submission of the planning application.

5.2.2 Wombwell Ings

5.2.2.1 Archaeology and Heritage Baseline

Archaeological assessments and investigations have been undertaken on the Wings Across the Ings (WATI) site to the immediate south of the application site. These have identified a 2nd century Roman settlement site comprising two areas of enclosures connected by a central spine ditch and a surrounding field system. The more significant settlement remains were located on an area of slightly higher ground within the site. Historic mapping (1772) demonstrates that the Wombwell Ings site was separated from this settlement site by the natural watercourse that Bulling Dyke subsequently replaced.

The desk-based assessment completed for the WATI site included the Wombwell Ings site within its study area. No recorded heritage assets are noted within the Wombwell Ings site boundary as recorded on the Historic Environment Record.

Historic mapping from 1757 indicates that Wombwell Ings was part of an area of unenclosed land. By 1772 the land was shown as under the control of several tenants and overall ownership of Trinity College Cambridge. It is unclear whether the tenanted land had been sub-divided into fields or were unenclosed strips within the Ings. By the time of the tithe map in 1839 the site was subdivided into north-south aligned linear fields which radiated from the line of Bulling Dyke and Ings Road along the southern boundary and were in a mix of pastoral or meadow use and arable cultivation (<http://www.floodplainmeadows.org.uk/sites/www.floodplainmeadows.org.uk/files/files/FPMP%20Unearthing%20the%20past.pdf>). Ordnance Survey mapping indicates that from the site continued in the same usage from the mid-19th century. The alignment of these field boundaries can still be traced in the lines of ditches bisecting the nature reserve. The site was noted as liable to floods indicating it was likely to have been marginal land.

A review of historical satellite imagery on Google Earth demonstrates that whilst the cropmarks associated with the Roman enclosures and field system to the south of the application site are visible on aerial imagery, no similar features are visible as parch marks or enhanced growth within the application site. Straight linear trends parallel with the former field boundaries are visible in some areas of the site indicating potential former arable cultivation in line with the historic mapping evidence.

5.2.2.2 Archaeology and Heritage Potential Impacts and Recommendations

Consultation was initiated with South Yorkshire Archaeology Service to confirm the proposed approach to archaeology and heritage within the planning application. Andrew Lines, Archaeologist, SYAS, provided initial feedback by telephone (17/10/18). Andrew Lines identified the record of some cropmark enclosures to the east of the Wombwell Ings site, adjacent to the disused railway line, recorded on the HER. Associated with these enclosures, but not available through publicly available sources online there have been findspots of material including wall plaster, tile and animal remains of probable Roman date as well as a number of other findspots of Roman material in the vicinity. When coupled with the known Roman site to the south on the WATI scheme this leads to an elevated potential that the area is more intensively utilised during this period and therefore there is potential for remains of Roman date on the site.

A programme of geophysical survey around the location of the perimeter ditch was recommended to assess the potential presence of buried archaeological remains, particularly those of Roman date. The RSPB have commissioned Magnitude Surveys, a specialist archaeological geophysical survey company, to undertake the geophysical survey. The survey will assess an approximate 40m wide corridor around the perimeter ditch which will allow any detected anomalies to be placed within context. The works will be undertaken in accordance with the Standards and guidance of the Chartered Institute for Archaeologists and a Written Scheme of Investigation agreed in advance with SYAS. The works were undertaken in December 2018. At the time of planning submission, analysis of the geophysical survey is being undertaken. A final report of findings is expected to be issued by Magnitude Surveys in mid-January. The report will be provided during the determination period to allow the results to inform consideration of whether any further archaeological investigation is required to be undertaken on the site as a condition of the planning permission.

5.3 Ecological Impact

An Ecological Impact Assessment (EclA) has been undertaken in order to assess the ecological impact of the proposed development at Old Moor and Wombwell Ings on the site and nearby designated sites. The EclA report accompanies this planning application. The EclA assesses the impact of the proposed development on Designated Sites, Habitats, Flora and Fauna. The impact assessment identified potential negative impacts on the following ecology:

- Hedgerow – Overflow Car Park (as a result of hedgerow removal)
- Lowland Neutral Grassland (habitat loss as a result of wetland re-profiling)
- Protected a Notable species (loss of common spotted orchid as a result of re-profiling)
- Invasive species – Japanese Rose, New Zealand Pygmyweed (inadvertent spread of invasive species resulting from clearance of existing habitats/habitat creation)
- Amphibians (disturbance of breeding habitat)
- Birds (disturbance - nesting birds)
- Birds (habitat loss - breeding birds)
- Water shrew (habitat loss and disturbance)
- Water vole (disturbance of breeding habitat).

The EclA provides mitigation, compensation and enhancement measures intended to minimise the negative impacts identified above. The EclA concluded that implementation of the recommendations the proposed development should result in an overall significant positive enhancement of the district/regional biodiversity value, particularly for wetland birds. The EclA includes recommendations for further surveys, mitigation and compensations activities to ensure that the development contributes positively to local biodiversity during construction and operation. These recommendations will be implemented by the RSPB.

5.4 Tree Survey

The EclA does not identify any significant impact to trees as a result of the works proposed at Old Moor and Wombwell Ings. The site is largely devoid of mature trees. The RSPB have sought the advice of arboricultural contractor and consultants Anderson Tree Care to further advice on whether a tree survey for the sites is necessary. Anderson Tree Care (letter from Gary McCarthy, Operations Manager) confirms that they do not consider a tree survey for the site necessary due to an absence of trees within the proposed works areas. The letter from Anderson Tree Care accompanies this planning application, and abridged below:

"Whilst at the site you showed me the areas where the works were to be undertaken and supplied me with maps to illustrate the extent of the works. From my visit I can confidently state that no trees will be impacted by the works due to the almost complete absence of any trees in the works areas. There are a group of Willows that are in proximity to the proposed re-profiling at Wader Scrape at Old Moor. These are located outside of the works and situated behind a post and wire fence and a drainage ditch. Due to this they are highly unlikely to be impacted by the works. The proposed works have also been assessed by independent ecologists and you have informed me they are happy for the works to proceed." Gary McCarthy, Anderson Tree Care.

5.5 Geotechnical

Preliminary Geotechnical and Geoenvironmental Desktop Assessment have been undertaken for the Old Moor and Wombwell Ings sites. The reports accompany this planning application. The key findings and recommendations summarised below.

5.5.1 Old Moor

5.5.1.1 Preliminary Engineering Assessment

Re-profiling of banks

The re-profiling in different areas of the site will produce a volume of material comprising up to four (4No.) strata groups (made ground, interbedded alluvium, glaciofluvial sand and gravels, Pennine Middle Coal Measures bedrock of mudstone and sandstone). The quantity of each type of material excavated will depend on the base level of the excavation and the ground conditions encountered. Bulking of the excavated material will occur, and should be accounted for in the earthworks operations, especially when determining the amount of material that is to be transported from the site.

The stability of the re-profiled slopes will be a function of the ground conditions encountered in each area. Soft and loose, water bearing strata are anticipated to be beneath the site. Any high angled slopes (greater than 20°) with a high groundwater table are unlikely to be stable without retention or re-enforcement. Long term stability may require permanent control of seepage flows on the slopes.

Pavement and viewpoint construction

The central area of the site where the new pavement is to be constructed may require investigation to determine the bearing capacity and risk of settlement of the ground under the weight of the proposed infrastructure. These elements of design can be informed by ground investigation.

Island Construction

The movement of the material excavated in the formation of the re-profiling around the site, will require a Material Management Plan (MMP). This will inform how some of the spoil will be used to construct two shallow islands that are to be constructed in the larger body standing water in the centre of the site. The soft, wet ground area will be difficult for large plant to access.

During construction of the islands, the placed material will surcharge the ground and is likely to induce time dependent settlement. The construction of the islands should therefore be undertaken in stages, with an allowance of sufficient material to ensure the proposed target levels are maintained.

It should be noted that a material management plan (MMP) and the application for the appropriate licenses to export material from the Wombwell Ings and import material into Old Moor should be undertaken on completion of the ground investigation report following the recommended factual ground investigation.

5.5.1.2 Recommendations

The Geotechnical and Geoenvironmental Desktop Study recommends that a geotechnical assessment that would enable the assessment and mitigation (where feasible) of the risks outlined in the geotechnical risk register (GRR) is undertaken. This would allow for a better understanding of the level of risk (including failure of existing flood embankment, settlement of islands in the centre of the site, contamination from offsite sources, contamination during the proposed works, unrecorded underground services). It is proposed that an intrusive ground investigation and site walkover are undertaken prior to the implementation phase. The scope of the ground investigation is to be confirmed following a site walkover and further advice from the geotechnical engineer. However, the ground investigation is anticipated to include the following activities:

- 5No. dynamic (windowless) sampling boreholes in the location of the proposed visitor infrastructure, with 1No. on the viewpoint.
- 15No. excavated trial pits distributed around the areas of proposed works across the site.
- In-situ tests on soil samples to include standard penetration tests and hand shear vanes.
- Geotechnical and geoenvironmental testing on samples acquired during the intrusive ground investigation.

5.5.2 Wombwell Ings

5.5.2.1 Preliminary Engineering Assessment

Embankment Culvert

The geotechnical hazards associated with the construction of a culvert beneath the existing flood embankment to connect the River Dove to the proposed habitat onsite are outlined in Appendix A of the accompanying Geotechnical and Geoenvironmental Desktop Assessment report. An options appraisal is recommended to determine the most appropriate method of construction. This should consider the relative risks associated with each method including induced settlement, stability of the embankment of the embankment.

Excavation of the Perimeter Ditch

The construction of an open ditch around most of the perimeter of the site will produce a volume of material comprising up to four (4No.) strata groups (made ground, interbedded alluvium, glaciofluvial sand and gravels, Pennine Middle Coal Measures bedrock of mudstone and sandstone). The quantity of each type of material excavated will depend on the base level of the excavation and the ground conditions encountered. Bulking of the excavated material will occur, and should be accounted for in the earthworks operations, especially when determining the amount of material that is to be transported from the site.

The stability of the excavation will be a function of the ground conditions along the proposed ditch. Soft and loose, water bearing strata are anticipated to be beneath the site. This implies excavation is unlikely to be stable without shoring of the excavation walls, or temporary reduction of local groundwater levels. Long term stability may require permanent control of seepage flows into the ditch.

Island Construction

The movement of the material excavated in the formation of the open ditch around the site, will require a Material Management Plan (MMP). This will inform how some of the spoil will be used to construct two shallow islands that are to be constructed in the larger body standing water in the centre of the site. The soft, wet ground area will be difficult for large plant to access.

During construction of the islands, the placed material will surcharge the ground and is likely to induce time dependent settlement. The construction of the islands should therefore be undertaken in stages, with an allowance of sufficient material to ensure the proposed target levels are maintained.

Exportation of Material Offsite

The balance of spoil excavated will be exported offsite to the Old Moor Reserve, south-east of the site. This will require approval from the Local Authority that will be included as part of the MMP.

5.5.2.2 Recommendations

The open perimeter ditch is around 2.2km in length, requiring, in accordance with Eurocode 7, a minimum spacing of 200m is advised between exploratory positions. The risks outlined in the geotechnical risk register (GRR) include the potential to induce failure of the exiting flood embankment, settlement of islands in the centre of the site, contamination from offsite sources, contamination during the proposed works, unrecorded underground services.

In order to undertake a geotechnical assessment that would enable the assessment and mitigation (where feasible) of the risks outlined in the GRR, an intrusive ground investigation and site walkover are recommended within the Geotechnical and Geoenvironmental Desktop Study.

The scope of the ground investigation is to be confirmed following a site walkover and further advice from the geotechnical engineer. However, the ground investigation is anticipated to include the following activities:

- 4No. dynamic (windowless) sampling boreholes in the location of the proposed embankment culvert
- 2No. on the crest of the flood embankment
- 2No. at the toe of the flood embankment
- 24 No. excavated trial pits within 10m of the proposed open ditch alignment
- In-situ tests on soil samples to include standard penetration tests and hand shear vanes
- Geotechnical and geoenvironmental testing on samples acquired during the intrusive ground investigation.

6 Environmental Permits

Due to the location of the Old Moor and Wombwell Ings sites on Environment Agency washland and close to rivers, Environmental Permits will be required to be obtained from the Environment Agency before works can commence.

A review of proposed activities at Old Moor and Wombwell Ings has been undertaken with regards to Environmental Permitting requirements. The table below summarises elements of the proposed works likely to require an Environmental Permit(s). At the time of the planning application, Environmental Permit(s) have not yet been applied for as it is considered to be too far in advance of the commencement of construction works for the permit(s) to be awarded. However, RSPB are in discussions with the Environment Agency (Lisa Killick) to confirm requirements for Environmental Permit(s). Once planning permission is granted and the timescales for construction of each element of works confirmed, RSPB will liaise with the Environment Agency to obtain the necessary Environmental Permit(s) and begin the application process to ensure that the necessary permit(s) are granted prior to commencement of site works.

Element of proposed works	Permitting requirements
Wombwell Ings wet ditch	May be considered Permitted Development and will not require a permit. Confirmation from EA to be sought.
Old Moor earthworks	Standard rules SR2015 No 29 – Temporary storage within the flood plain of a main river
Creation of inlet structure at Wombwell Ings	SR2015 No 27: constructing an outfall pipe of 300mm to 500mm diameter Or, an exemption if the culvert is less than 300mm as per EA Guidance Exempt flood risk activities: environmental permits (FRA12). Confirmation from EA to be sought.
Temporary removal and reinstatement of washland bund at old moor	Likely to require a bespoke permit. Possibility of exemption from permit as per EA Guidance Exempt flood risk activities: environmental permits (FRA8). Confirmation from EA to be sought.
Storage of material on a floodplain – both sites	Standard rules SR2015 No 29 – Temporary storage within the flood plain of a main river



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