

CONDITION 16: Landscape Management Plan

Prior to commencement of development, a Landscape Management Plan shall be submitted and approved in writing by the local planning authority. The Landscape Management Plan shall include full details of soft landscape works including the woodland planting. Details shall include:

- a) Planting plans
- b) Written specifications
- c) Schedules of plants, noting species, plant sizes and proposed numbers/densities where appropriate
- d) Implementation programme

The plan shall also include details of long-term objectives, management responsibilities and maintenance schedules for all landscaped areas.

The agreed details shall be carried out in accordance with the approved details at all times thereafter.

Reason: To screen and enhance the appearance of the development to protect the character and appearance of the countryside and the amenities of the occupiers of neighbouring properties, enhance biodiversity and ensure that the soft landscaping works are carried out within a reasonable time period to accord with Policies DM4, DM6 and DM10 of the adopted Site Allocations and Development Management Policies (SADMP) Development Plan Document (2016).

Introduction

This document forms a Landscape Management Plan (LMP), prepared by Kedd Limited (Landscape Architects), associated with the permitted extension to the existing FP McCann Depot, off Brascote Lane, Cadeby, Leicestershire (Planning Permission ref. 22/00420/FUL). The information provided details written specifications, establishment and management regimes associated with each of the proposed landscape areas and associated landscape and habitat types, together with planting schedules. The document format and purpose being to provide a clear, concise and tactile reference document for use ‘on the ground’, by site personnel and contractors, to ensure the successful establishment and long term management of landscaping within the Site, for reasons of landscape structure, screening and biodiversity.

The document has been prepared in conjunction and should be read alongside the following approved drawing (see Appendix A of this document):

FPM-001-C.D.004 Site Layout Plan

In addition, where inset plans are provided within the LMP itself, full scaled versions within Appendix B of this document (Planting Plans).

REVISION B - FEBRUARY 2024 It is noted that this document forms a revision (Revision A) to that submitted in 2023, with associated updates / variations to the permitted landscape and ecological scheme being the result of ongoing liaison with the County Ecologist, including a site visits which have been carried out by the County Ecologist and members of the FP McCann consultant team. Based upon these site visits and visible variations in habitat presence, suitability of ground surface, this document provides an updated scheme based upon requests made to FP McCann, including a reduced intervention approach with a focus on natural regeneration in key areas, together with the integration of an artificial sand martin bank, which did not form part of the permitted scheme. The drawings in Appendix B have been updated to take on board these changes, with specifications and management regimes refined throughout the LMP. Details relating to the artificial sand martin bank creation are provided within Appendix C.

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FPM-001-C.D.004 Site Layout Plan

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PLANTING PLANS REVISION B

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Permitted Development

The Drawing Extract opposite, illustrates the permitted Site Layout and areas of associated landscaping and habitat development. These areas being the focus of this Landscape Management Plan (LMP).

Outline Objectives

With respect to landscape, the primary objectives of the permitted scheme are:

- to provide a meaningful landscape structure to the extension area and physical connectivity with its peripheral land uses and habitats
- to enhance the setting of the Brascote Lane corridor with supplementary Native Tree & Shrub Planting
- to provide boundary screening to the south, connecting into existing woodland to the east
- to deliver a defined Biodiversity Enhancement Area to the north of Brascote Lane to establish a mosaic of new habitats
- to strengthen the existing woodland / vegetation structure of the Site to increase its quality as a landscape feature and its opportunities for Biodiversity
- to manage and maintain

Habitats & Landscape Features

The following landscape habitats will be established and managed:

- Native Tree & Shrub Planting (including Woodland Edge)
- Mixed Scrub
- Ponds & Surface Water Management Ditches - including Reedbed
- Retained Sandy Substrate
- Natural Regeneration - Open Mosaic Habitat - including Scrapes
- Bare Ground adjacent to existing Woodland Edge - Naturally Regenerating



Proposed New Native Tree & Shrub Planting

New Native Tree & Shrub Planting is proposed within 2No. areas of the Site as follows:

- 1. Supplementary woodland edge planting to the south and east of the Site
- 2. Tree & Shrub Planting to the Brascote Lane corridor

A single species composition is proposed (see opposite). With respect to the Brascote Lane corridor, this is to be reduced to provide defined linear structure, whereas elsewhere within the Site, it is proposed to support a typical and enhanced diverse woodland structure, including for fruit bearing trees to aid in biodiversity.

The establishment and management of the habitat areas is as follows:

Preparation / Establishment:

All stock to be planted at 2m centres in single species groups of 5-7 plants. Stock to be supplied between 300 to 600mm in height. Shrub species to be concentrated to the edges of the planting blocks.

All stock to be planted in 300 x 300 x 300 pits backfilled with 50% original soil and material and 50% non-peat-based tree planting compost incorporated 20 grams of a suitable slow release fertilizer.

Stock to be protected by a 600mm tree / shrub shelter secured to 750 x 20mm square softwood stake by 2No plastic tree ties.

Management:

- Annual winter failed 'beating up' inspection within the first 5 years of aftercare. This will include the replacement of dead / diseased or dying plant stock (in the next appropriate planting season).
- Trees should be watered during any dry spells in the first growing season.
- Weeding to 1m diameter around the bases of the trees will be required to help combat competing vegetation.
- Tree guards and canes should be inspected annually to ensure their integrity.
- Once the trees have matured the tree guards must be removed (by Year 5).
- Formative pruning should take place throughout the first 10 years to counter poor structure and development.
- Once established (~10 years) the Hazel should be coppiced. Coppicing should be undertaken in stages with one third of the Hazel coppiced every 5 years.
- Tree thinning (25%) should also be undertaken if necessary, to enable primary species to gain maturity.
- Monitoring of the management regime should be undertaken on an annual basis in order to assess the success of the scheme towards achieving the proposals of the landscaping strategy and the specific habitat aims and objectives. Based on an assessment of the progress towards these aims, changes to management strategies may be necessary.

Species Specification & Stock Numbers:

Native Tree & Shrub Planting					BRASCOTE LANE CORRIDOR 0.11 Ha	EASTERN BOUNDARIES (WOODLAND EDGE ONLY) (345 m²)
Species	Common Name	%	Height (cm)	Bareroot (BR) / Container Grown (CG)	Number of Plants	Number of Plants
Acer campestre	Field Maple	10	30-45	BR	27	
Betula pendula	Birch	10	30-45	BR	27	
Carpinus betulus	Hornbeam	5	30-45	BR	14	
Fagus sylvatica	Beech	5	30-45	BR	14	
Quercus robur	Oak	15	30-45	BR	41	
Sorbus aucuparia	Rowan	5	30-45	BR	14	
Tilia cordata	Small-leaved Lime	5	30-45	BR	14	
Shrubs						
Corylus avellana	Hazel	10	45-60	BR	27	9
Crataegus monogyma	Hawthorn	8	30-45	BR	22	7
Ilex aquifolium	Holly	3.5	30-45	CG	10	3
Malus sylvestris	Crab Apple	5	30-45	BR	14	5
Prunus spinosa	Blackthorn	5	30-45	BR	14	5
Prunus avium	Wild Cherry	5	30-45	BR	14	5
Pyrus pyraser	Wild Pear	5	30-45	BR	14	5
Rosa canina	Dog Rose	3.5	2 year	BR	10	3
		100		TOTALS	276	42

5 Year Aftercare Regime:

Management Activity	Y1	Y2	Y3	Y4	Y5
Pruning to counter poor structure and development (where necessary)					
Maintenance of tree / shrub guards					
Clearance of herbaceous material from tree guards					
Failed plant 'Beat Up' to 85% stocking to next season					
Tree guards removed (if established)					

Action Within this Period

No Action Required

New Mixed Scrub

New mixed scrub is to be established to the south of Brascote lane, to supplement existing woodland and areas to be managed via natural regeneration.

The establishment and management of the habitat areas is as follows:

Preparation / Establishment:

- Planting will be directly into the restored and cultivated soil profile.
- All stock to be of local provenance.
- All stock to be planted at 2m centres in 300x300x300mm pits backfilled with original ground material and / or notch planted - in a triangular / offset grid pattern to minimise potential for wind tunnels.
- Areas to remain vacant of planting to allow for natural succession and growth.
- Stock to be planted in species pure groups of 3, 5 and 9 plants.

Management:

- Stock should be watered during any continuous dry spells in the first growing season.
- Weeding / spraying of herbicide in 1m diameter around the bases of the trees will be required to help combat competing vegetation through establishment.
- Following the 1st growing season, each winter an inspection of plant failures will be carried out, and a 'beating up' schedule produced, which will include recommendations for the replacement of dead / diseased or dying plant stock, replacement / straightening of tree guards and stakes, removal of herbaceous vegetation from tree guard as necessary, to ensure successful establishment.
- To control weeds and allow proper growth and prevent unwanted succession by invasive species, each spring, one application of an approved glyphosate will be applied (if required) by spot spraying of any unwanted vegetation.
- During years 1 to 3, three maintenance visits will be made per annum (February, May and September).
- During the May and September visits, any dead / diseased or dying species are to be taken out and removed off site and replaced during the following planting season (November to February), to ensure an 85% overall stock density by year 3.
- In September, encroaching vegetation is to be trimmed or mown only (as required). Otherwise vegetation between plants is to be left to become rank herbage. Mowing / flailing the edges of the establishing habitat will seek to maintain open edges and promote flowering herbs.
- The tree guards and canes should be inspected to ensure their integrity. Once the stock has matured, the tree guards must be removed. Note: this action will be required outside of the aftercare period and should be undertaken by the landowner.
- Post establishment, vegetation is to be cut back by 25% each year, in rotation, to diversify structure and species composition and to encourage re-growth. This should be carried out outside of the bird nesting season.

Species Specification & Stock Numbers:

Scrub Planting					WIDER SITE (SOUTH OF BRASCOTE LANE)
					0.03 Ha
Species	Common Name	%	Height (cm)	Bareroot (BR) / Container Grown (CG)	Number of Plants
Crataegus monogyma	Hawthorn	30	30-45	BR	24
Rubus fruticosus	Bramble	10	30-45	BR	8
Prunus spinosa	Blackthorn	20	30-45	BR	16
Ulex europaeus	Gorse	15	30-45	BR	12
Sambucus nigra	Elder	15	30-45	BR	12
Rosa arvensis	Field Rose	5	30-45	BR	4
Rosa canina	Dog Rose	5	30-45	BR	4
		100			
TOTALS					80

Planting Density: 2m centres (triangular grid)

5 Year Aftercare Regime:

Management Activity	Y1	Y2	Y3	Y4	Y5
Maintenance of tree / shrub guards					
Clearance of herbaceous material from tree guards					
Failed plant 'Beat Up' to 85% stocking to next season					
Application of approved glyphosate herbicide					
Strimming / mowing of encrouching vegetation (if required)					
Tree guards removed (if established)					
Rotational 'cut back' (25% per year)					

Action Within this Period No Action Required

Ponds & Surface Water Ditches

1No. New Pond / Waterbody is to be created as part of the Permitted Development, within the Biodiversity Enhancement Area. Existing Ponds to the south east of the site are to be retained, with the northern to be utilised for surface water management purposes. In addition to the surface water management pond, a surface water management ditch is to be established to the eastern boundary of the Site (south of Brascote Lane).

Within the Biodiversity Enhancement Area, the primary focus of the pond is for nature conservation / biodiversity and as such, the pond has been designed to incorporate variances in depth, to provide the widest potential species suitability possible. Shallows from 0.1m to 1m are to be delivered, together with areas of deeper water of between 1m and 2m, ensuring areas of open water are maintained, free of surface emergent vegetation. A pond design is provided overleaf. The extent of surface area being guided by the delivery of optimal habitat for Great Crested Newts (GCN). No supplementary planting / seeding is proposed within the northern Biodiversity Enhancement Area / GCN Pond.

With respect to the surface water management pond to the south of the site, whilst this ponds primary function is for managing site water, the pond has been designed to enable peripheral reedbed habitat to be sustained, expanding upon that associated with the existing ponds in this location. A combination of translocation and new plug planting will enable this to develop successionally. The existing pond to to the south of this will be maintained for biodiversity benefit, principally relating to peripheral reeds and the maintenance of areas of open water, clear of vegetation (via reedbed management).

Natural regeneration will be a principle method of extension of habitat, the extent of which is to be controlled by annual management. The establishment and management of the ponds is as follows:

Preparation / Establishment:

- To maintain water within the GCN pond (Biodiversity Enhancement Area), the pond is to be clay lined.
- Fertilisers are not to be used within 6m of water bodies and ditches.
- No plants are to be introduced to water bodies or ditches other than translocated reed within the southern, existing ponds.
- Prior to reed establishment adjacent to the existing / surface water management pond within the south of the site, the soil layer is to be disced and power harrowed to a depth of 200mm (no works to be carried out within the Biodiversity Enhancement Area).

Management:

- Ditch, pond and pool banks are to be cut on a 2-5 year rotational basis between September and February to avoid disturbance to small mammals in particular and to prevent the establishment of any dominant plant species.
- Ditches and ponds are to be cleared if necessary on a rolling rotational basis so that only 1/3 of the vegetation is cleared every 2 years or 1/6 every year. This is to provide a mosaic of various habitats of differing ages, structures and heights of vegetation, to allow for the development of diverse drainage channel systems for wildlife where all phases of succession are represented, from recently cleared sections to silted and well-vegetated ones.
- Clearance is to be carried out between October and February, by machinery with a weed cutting bucket rather than a hard edged bucket to lessen damage to banks. This is to be carried out outside of amphibian hibernation season.
- The pond within the Biodiversity Enhancement Area is to be maintained with standing water.

Reedbeds (5,560m² total within the south eastern area (1,410m² existing to be retained):

With respect to areas of reedbed, Phragmites australis (opposite) are to be harvested from the existing site ponds (south eastern area). Typically, a 0.9m stem would be cut and dibbed 0.6m into the ground at a rate of 4/m², leaving a small length of stem exposed - planted within areas of 0.1m and 1.0 in depth. Once established, areas of reedbed are to be cut in winter at a rate of 25% per year, to encourage vigorous re-growth. Persistent injurious weeds will be removed by hand pulling or cutting. Existing reed to the south of the site is to be translocated to proposed areas of reed, grouped to enable successful natural regeneration of the habitat. 30% of the southern area to be planted- in groups.

Reed Specification:

Species	Common Name	%
Phragmites australis	Common Reed	100

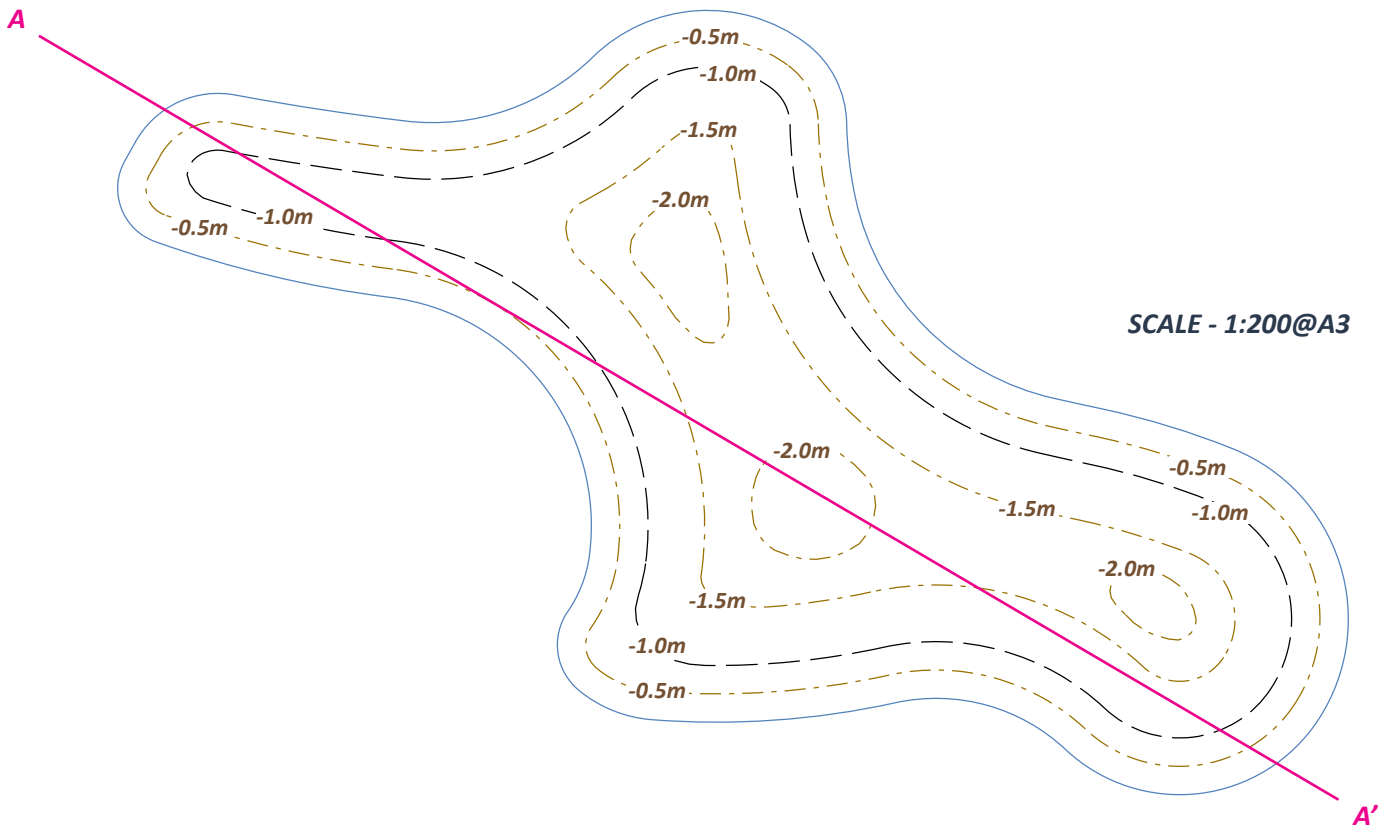
Planting Density: 4No. /m²

Pond Design (Biodiversity Enhancement Area):

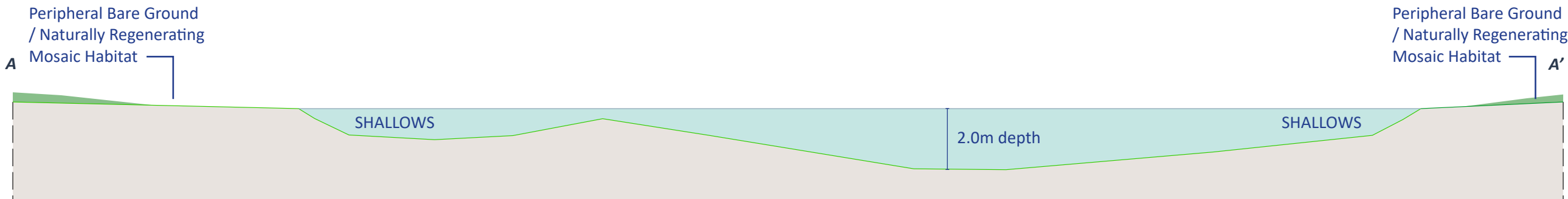
DESIGN

Pond Surface Area: 306m²

The pond has been designed to optimise habitat suitability. The pond will incorporate variety in depth, as per the design opposite, to incorporate shallows (0.1m to 1.0m) and areas of deeper water (1.0 to 2.0m) to sustain open water, free of surface vegetation. No supplementary planting / seeding is proposed within the northern Biodiversity Enhancement Area / GCN Pond.



ILLUSTRATIVE CROSS SECTION (A-A')



Existing Ponds (Surface Water Management):

Existing ponds are to be retained for reasons of surface water management. The peripheral vegetation comprising existing developed reedbed. Clearance works are to take place to ensure areas of open water are maintained, with reed redistributed and managed as per details on Sheet 5.

Bare Ground / Sandy Substrate (Biodiversity Enhancement Area):

In accordance with the permitted scheme and as illustrated on Figure 1 within Appendix B, an area of existing Bare Ground / Sandy Substrate will be retained within the north eastern corner of the Site - within the Biodiversity Enhancement Area. The retention of the area of bare ground will protect existing habitat areas with suitability for invertebrates, together with the potential for natural succession of local plant species.

Within this area, whilst no active management is proposed other than strimming to compete against peripheral vegetation growth, it is proposed that timber gained from woodland management regimes will be used to create log piles in areas of this bare ground- in order to create habitat variation encouraging invertebrate diversity. This will also create suitable refuges for any amphibians that colonise the site in the long-term. This natural feature is to be subject to no formal management, but monitored throughout the lifetime of the aftercare management period.

Natural Regeneration to Support an Open Mosaic Habitat (Biodiversity Enhancement Area) - including addition of Scrapes:

The central section of the Biodiversity Enhancement Area is proposed for natural regeneration, which based upon the existing successional vegetation and peripheral composition of scrub and woodland, will establish naturally to form an Open Mosaic Habitat. Natural variations in the ground surface will ensure that a diverse composition of vegetation can establish with micro conditions and the ability for seasonally wet areas to occur. In addition a series of shallow 'scrapes' will be established within the existing ground plane, to provide topographic variety, hollows and natural seasonal ponding, with micro habitat / conditions to vary vegetation growth typologies and species presence. Approximately 6No. scrapes / depressions are to be excavated from the existing surface, maintaining hollow feature with shallow gradients to margins, with limited total depth to ensure water is not accommodated permanently / all year round.

As with the wider area of Bare Ground / Sandy Substrate, limited active management is proposed, with peripheral vegetation being allowed to extend naturally into the area. However, an important component of the Open Mosaic Habitat type is the presence of areas of bare ground. As such, the establishment of the area is to be monitored annually, with dominant vegetation, likely to be scrub, removed periodically to retain an approximate 30% bare ground cover within the overall habitat area. Management typically being limited to a 5 year rotation. Where grassland emerges, it is proposed to limit management, again, to a 5 year rotation, where the sward would be strimmed with arisings removed from site. All works are to be outside of the bird nesting season, with grassland / emergent wildflower species allowed to flower and set seed prior to cutting taking place.

Bare Ground adjacent to Existing Woodland Edge (Naturally Regenerating):

Based upon liaison with the County Ecologist, the landscape corridor proposed to the eastern boundary of the site, between the permitted operational development and existing mature vegetation structure to the east, has been adjusted to be more ecologically focussed. Previously being permitted as grassland, it is now proposed that this area form a linear corridor of, initially, bare ground, with a low intervention approach to management to enable natural regeneration to occur associated with adjacent mature and established habitat. It is considered that this approach would long term, deliver a more biodiversity rich corridor to the eastern boundary of the and would be more suitable for substrate which is present on site and its capacity as a grassland growing medium.

As noted above, the preferred approach is for a low intervention management, and as such, it is proposed for management of the corridor to be limited to seasonal strimming (if required), together monitoring and subsequent selective / spot treatment of notable pernicious weed species which could subsequently dominate.

Long Term Objectives

The landscaping scheme for the site has been designed to promote biodiversity enhancement within the site, together with the enhancement of the existing structural landscape setting of both the site and Brascote Lane

The management actions detailed within the LMP are required to maintain the success of created priority habitats, and protected vegetation structure, which will ensure that suitable habitats are present to support a range of species which are known to occur in the area, whilst also enhancing local landscape character and setting.

There are three main long term aims objectives associated with the management of the site:

- **To secure the long-term success of the landscape structure, priority habitats and features created / protected - including species rich grassland, water bodies (including aquatic and marginal vegetation), woodland, defined areas of scrub , low intervention open mosaic and bare ground (natural regeneration) habitats, together with and an in-situ sand face and supplementary artificial sand martin habitat**
- **To maintain the long term screening afforded towards the site by peripheral and ‘to be created’ vegetation structure and thus the site’s assimilation into its local setting**
- **To increase the biodiversity value of the site through successful establishment and management of habitats**
- **To establish and manage a quality and locally distinct landscape parcel.**

The management of the site will be carefully reviewed to ensure the success of all land uses and habitats. Where landscape / habitat management is not working, remedial measures will be taken to correct the identified issues. Each land use / habitat will be allowed a suitable amount of time to establish before any remedial measures are taken. This will likely be at least two years to allow for any unusual seasonal activity.

Regular monitoring will occur for each land use / habitat to ensure that the management actions prescribed are appropriate.

Management Responsibilities

The responsibility for the implementation of the plan is to be by FP McCann. Members of the FP McCann team specifically deal with land and estates matters, budgeting and management.

This LMP is a live document that can change where current management measures are not found to be successful. Changes will be highlighted in the revised LMP document and the actions will be carried out as necessary at the next appropriate stage (which may be season dependent). The implementation of this monitoring and feedback system will ensure that the original aims and objectives of the approved scheme are met and delivered.

All works will be in accordance with the permitted scheme and approved conditions.

APPENDIX A: Permitted Drawings

FPM-001-C.D.004 Site Layout Plan





LEGEND

- Application Site Boundary
- Existing FP McCann Facility
- Surrounding Woodland
- Existing Woodland within the Site
- Built Form (including Proposed Tile Factory)
- Proposed External Storage Areas
- Proposed Primary Internal Access Corridors
- One-Way Access
- Two-Way Access
- Supplementary Native Tree & Shrub Planting
- Biodiversity Enhancement Area - Mosaic of Habitats
- Reedbeds
- Surface Water Drainage Ditch and Ponds
- 4m High Noise Attenuation

FIGURE 4

Heatons
Planning Environment Design

PROJECT
Cadeby - FP McCann

DRAWING TITLE
Proposed Site Layout Plan

DATE
March 2022

REFERENCE
FPM-001-C.D.004

SCALE
1:2,500 @ A3

STATUS
FINAL

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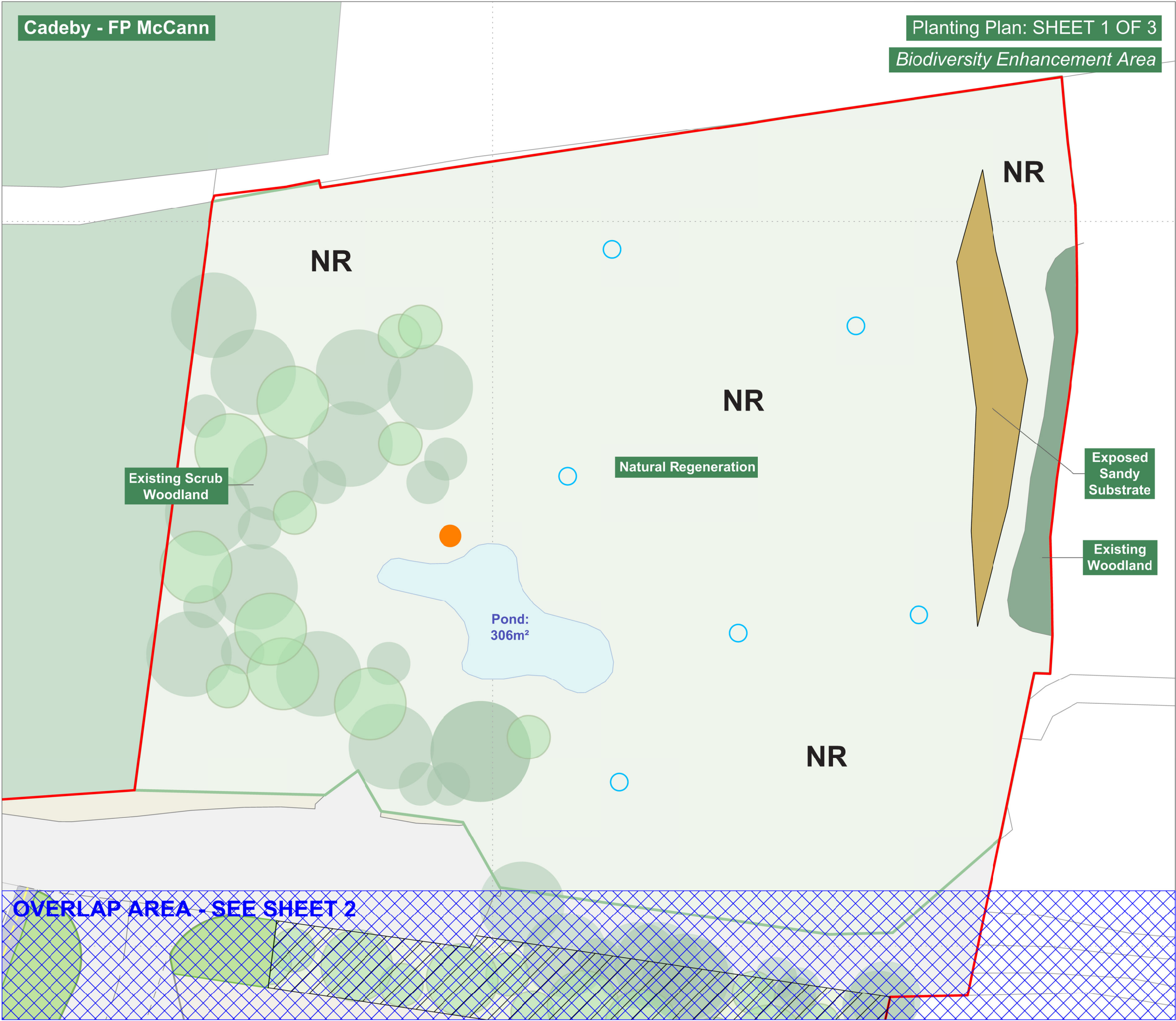
APPENDIX B: Planting Plans Revision B

FIGURE 1: Planting Plan - Sheet 1 of 3 - Biodiversity Enhancement Area

FIGURE 2: Planting Plan - Sheet 2 of 3

FIGURE 3: Planting Plan - Sheet 3 of 3





LEGEND

- Planning Permission Boundary
- Extent of Biodiversity Enhancement Area
- Natural Regeneration (Open Mosaic Habitat)
- Wildlife Pond
- Area of Retained Open Ground / Sandy Substrate
- Artificial Sand Martin Face
- Indicative Location of Scrapes to be Established (~6No.)

FIGURE 1

Heatons
Planning Environment Design

PROJECT
Cadeby - FP McCann

DRAWING TITLE
Planting Plan: Sheet 1 of 3

DATE	REFERENCE
Feb 2024	FPM-001-C.D.013A Rev B

SCALE	STATUS
1:500 @ A3	FINAL

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LEGEND

- Planning Permission Boundary
- Extent of Biodiversity Enhancement Area
- Native Tree & Shrub Planting
- Mixed Scrub
- AG Amenity Grassland
- BG Bare Ground - Natural Regeneration
- BG Bund - Natural Regeneration
- Wildlife Pond
- Aquatic Marginal Vegetation
- Proposed Reedbed

FIGURE 2

Heaton's
Planning Environment Design

PROJECT
Cadeby - FP McCann

DRAWING TITLE
Planting Plan: Sheet 2 of 3

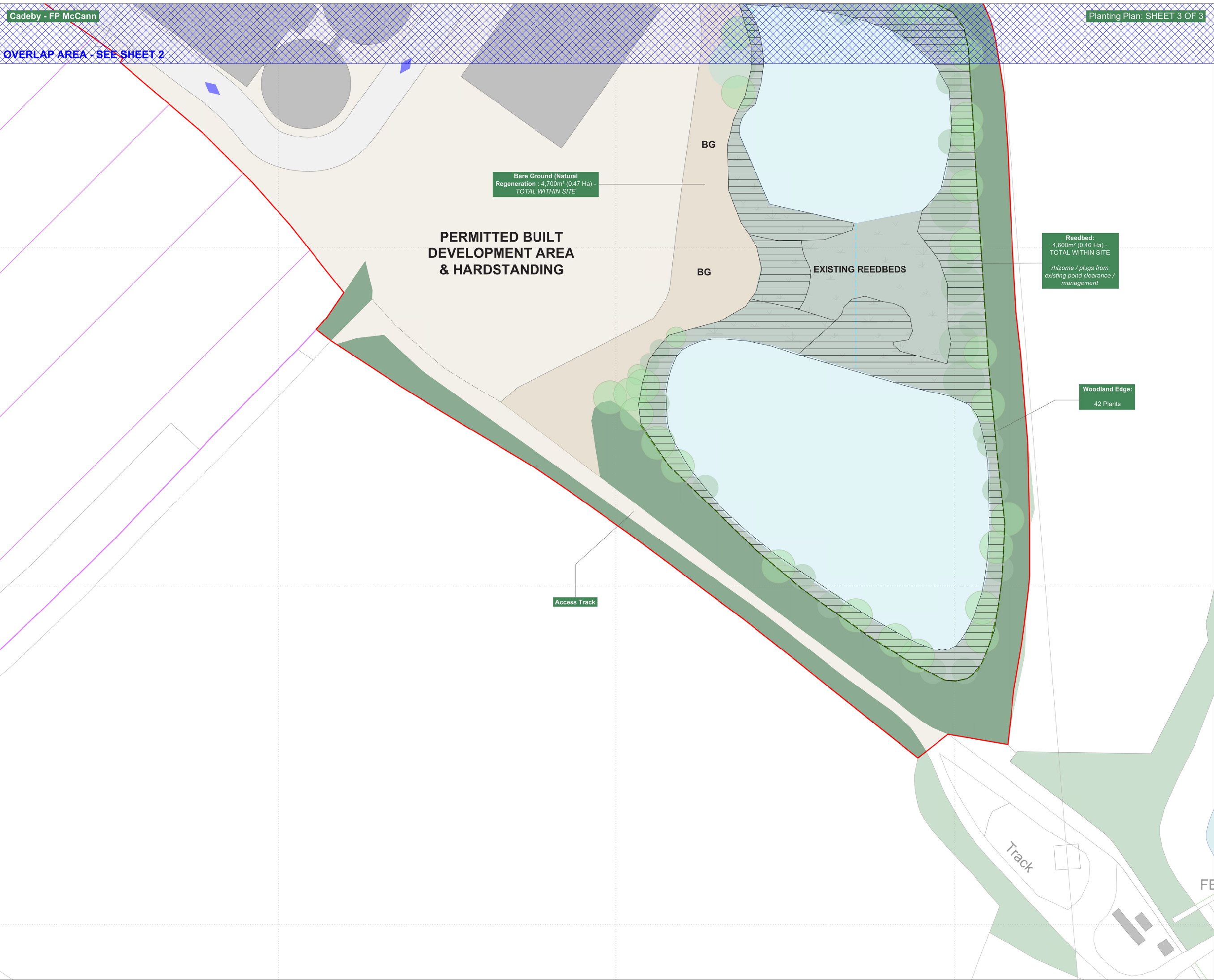
DATE
Feb 2024

REFERENCE
FPM-001-C.D.013B Rev B

SCALE
1:1,000 @ A1 / 1:500 @ A3

STATUS
FINAL

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LEGEND

- Planning Permission Boundary
- Extent of Biodiversity Enhancement Area
- Native Tree & Shrub Planting
- Mixed Scrub
- AG Amenity Grassland
- BG Bare Ground
- BG Bund - Natural Regeneration
- Wildlife Pond
- Aquatic Marginal Vegetation
- Proposed Reedbed

FIGURE 3

Heatons
Planning Environment Design

PROJECT
Cadeby - FP McCann

DRAWING TITLE
Planting Plan: Sheet 3 of 3

DATE Feb 2024	REFERENCE FPM-001-C.D.013C Rev B
SCALE 1:1,000 @ A3 / 1:500 @ A3	
STATUS FINAL	

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APPENDIX C: Sand Martins Artificial Bank Creation



SAND MARTIN ARTIFICIAL BANK CREATION

- 1.1 It is proposed to create an artificial sand martin bank to enhance the site. The artificial bank is set to be located adjacent to the proposed waterbody in the north-western corner of the site.
- 1.2 The proposed sand martin artificial bank will be created in the location denoted by the orange circle on Figure 1 below:

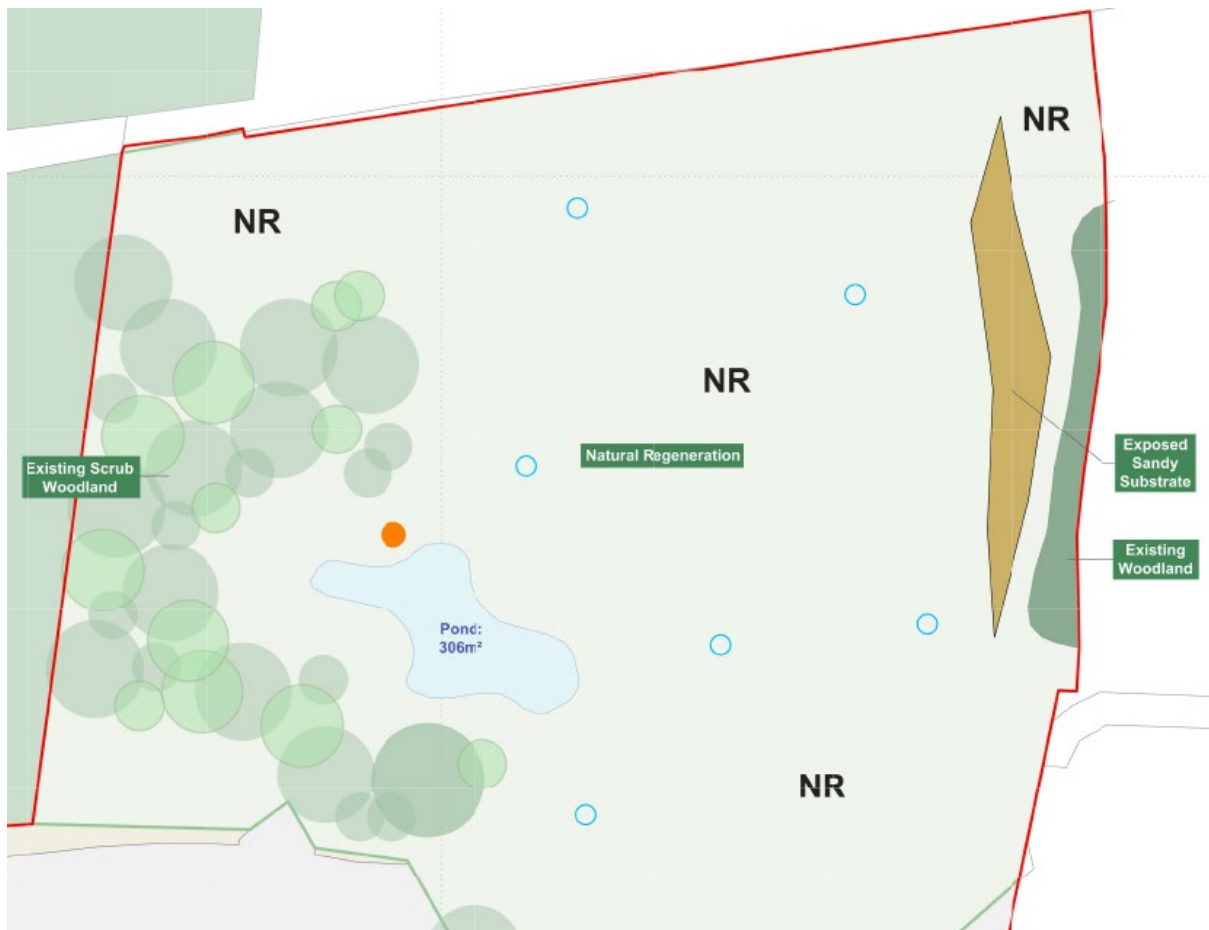


Figure 1

- 1.3 Below outlines a rough methodology for the creation of the nest boxes.

COMPOSITION

- 1.4 The structure is composed of:
- A front wall made up of two rows of cement blocks. Solid blocks up to 1.5m and above that an outer row of cavity blocks containing the entrance tunnels and an inner row of cavity blocks containing the nest chambers (see Figure 2 below for example);

- A passage which runs between the front and back wall. The passage allows the nest site to be accessed for cleaning maintenance and research;
- It is best to cover the pipes with sand for the birds to excavate. This process should be redone each winter;
- A back wall; and
- A roof covering the whole structure.

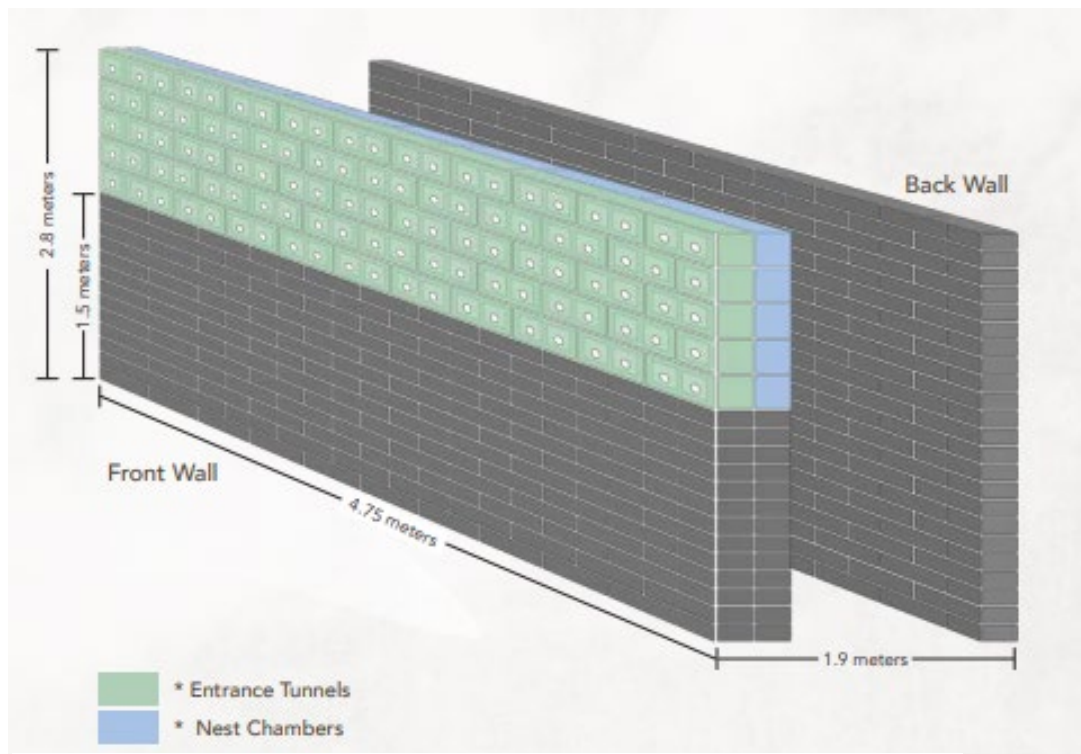


Figure 2

- 1.5 As sand martins are colonial nesters, it is recommended that the structure should provide a minimum of 30 nest chambers, more if space allows.
- 1.6 Materials used to build the wall includes:
 - Solid cement blocks for the base layers and the parallel back wall; and
 - 9" wide cavity blocks for the rest of the wall.

METHODOLOGY

Step 1 – Making nest chamber entrance tunnels

- 1.7 The nest chambers are to be placed sloping slightly uphill, especially the lowest row of chambers, to prevent any water entering the nest chamber. However, to give a more random appearance to make the nest look more like a natural colony, it is

recommended that every other tunnel was sloping uphill whilst the other was more or less horizontal.

1.8 The nest chamber entrance tunnels are to be pre-prepared within the cavity blocks before the start of any building work.

1.9 Method of making the tunnel:

- 1) Place a silicone sealant tube or piece of pvc pipe in a cavity block (roughly 45 – 50mm);

NOTE: For a sloping tunnel, one end of the tube should be flush with the bottom of the block and then tilted slightly towards the nest chamber. The end result is that the when the tunnel reaches the nest chamber it is approximately 5cm above it and you will have to fill the nest chamber with builders sand until is it at the same level as the tunnel.

- 2) Make up a quantity of concrete (approximately 5 parts sand to 1 part cement) – *see instructions on the cement packet*. Carefully fill the space around the tube with the concrete mix to hold the tunnel tube in place (as detailed above under (1));
- 3) Before the concrete has fully set remove the plastic tube leaving a perfect tunnel with a diameter of 45 – 50mm (depending on size of tube you have used).



Step 2 – Foundations

- 1.10 Dig and lay foundations, see image below.
- 1.11 NOTE: *The dimension of the foundations will vary depending on the size of wall you want to build and the terrain you are building on e.g. peaty, rocky, sandy, etc. You may wish to get a registered builder to lay the foundations of your own wall depending on size and location of your project.*

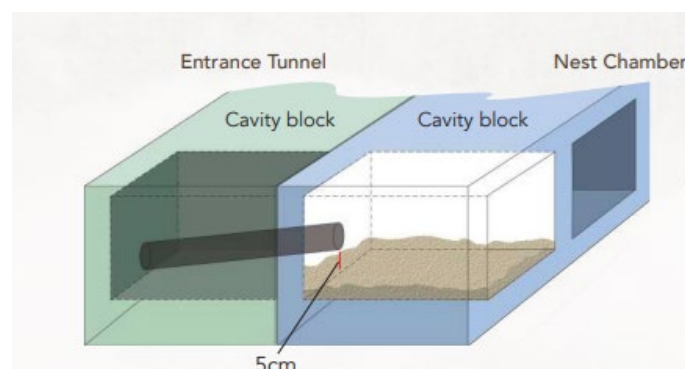


Step 3 – Building the nesting wall

- 1.12 The face of the wall must be vertical – as this reduces the risk of predators accessing the nest site.
- 1.13 Once the base is cured build two rows cement blocks until it reaches a height of 1.5m above ground level. From there use cavity blocks (see step 4).

Step 4 – Placement of tunnels and nest chamber

- 1.14 The first row of tunnels should be at least 1.5m above ground level or the highest water level.
- 1.15 The outer row is composed of the pre-prepared cavity blocks that contain the entrance tunnels (from step 1).
- 1.16 The inner row is composed of the cavity blocks which will be used as the nest chambers (see example diagram below).



- 1.17 In regard to the nest chambers, line the floor of the nest chambers with 2" / 5cm of builders sand so that it is level with the bottom of the tunnel.

- 1.18 In terms of closing off the nest chambers, the back of the nest chambers will be closed off with a 9x1" timber plank which is fixed securely in place. Other projects have put individual doors on the back of the chambers which allows easy access for cleaning, inspection, ringing and monitoring (only to be carried out under NPWS licence). See example image below.



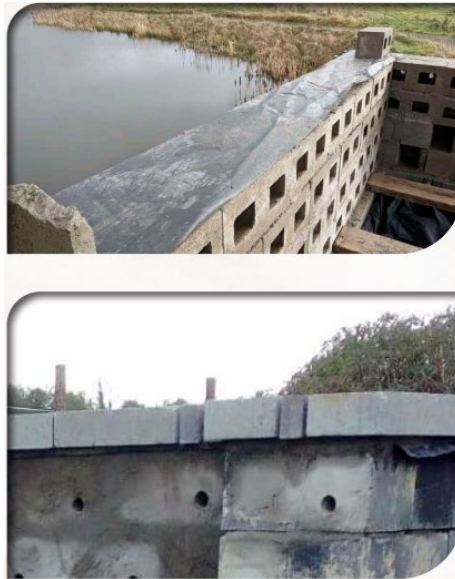
Step 5 – Passage and rear wall (Optional)

- 1.19 If a passage is desired, to access the nest chambers, then a parallel wall is needed, using a solid cement block to the same height as the nesting wall (as seen in the image below).



Step 6 – Top of wall and front of wall

- 1.20 Cover the top of the nesting wall with waterproof membrane and capping stones (as seen in the image below).



- 1.21 In terms of the front of the well, sheets of steel are to be fixed to the bottom of the wall (from ground level or the highest water level) to the first row of tunnels. The smooth surface of the sheets makes it difficult for predators to climb up to the nest entrances. Masonry fixings are used to fix the sheets of steel to the wall (as seen in the image below).



Step 7 – Roof

- 1.22 Place a piece of corrugated sheeting or something similar to act as a roof. This is to keep the structure weatherproof and is not for carrying any weight. It is essential that this is to be secured in place.

ADDITIONAL NOTES

- 1.23 It must be noted that this methodology has been extracted in parts from the Thomastown Sand Martin nesting wall Project (<https://assets.gov.ie/238822/5cf3e510-668f-4109-81f3-2c4c58d0b336.pdf>) and has been prepared to provide advice and guidance.