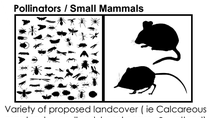
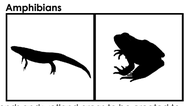
TARGET FAUNA POST RESTORATION

Pollinators / Small Mammals



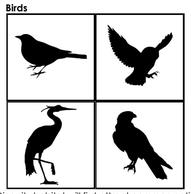
Variety of proposed landcover (ie Calcareous grassland, woodland, hazel copse, & wetland) offer habitats to sustain diverse populations of insect, mollusc, small mammals and birds.

Amphibians



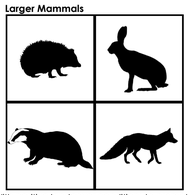
Ponds and wetland areas to be created to attract amphibian species with grassland and hibernacula.

Birds



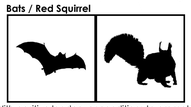
Diversity habitat will first attract common native birds & in time with appropriate management encourage a hierarchy of bird species (incl raptors). Exposed rock faces combine with wetland habitat to offer excellent nesting & feeding ground for raptors such as Peregrine.

Larger Mammals



With positive landcover conditions to promote a healthy insect, small bird and mammal population, combined with a balance of woodland, calcareous grassland & wet meadow habitat; larger native mammal such as hare, hedgehog, badger & fox will be encouraged.

Bats / Red Squirrel

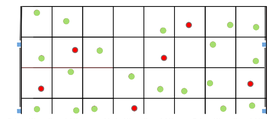


With positive landcover conditions to promote a healthy insect population, combined with roosting and nesting opportunities, protected species such as bat and red squirrel will be encouraged.

NOTE:
No herbicides or pesticides to be permitted during the establishment or extractive operational stage or after operations have ceased & restoration established.

PLANTING DETAILS

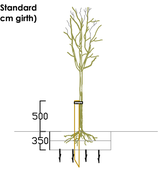
Distance of Woodland Belt Varies (Refer to plan)



Edge Woodland Mix | Main Woodland Mix | Edge Woodland Mix

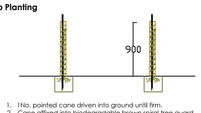
Boundary strip of woodland/hedgerow screen mix
Approx 2m wide band of woodland edge species.

Light Standard (8-10cm girth)



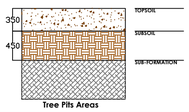
1. 75mm dia stake pressure treated driven min 800mm below ground 500mm above ground
2. Tie affixed to tree with Tom tie.
3. Pit with open textured face.
4. Topsoil min 350 depth within pit
5. Fork over base of pit.
6. To have a clear stem height of 1800mm, girth 8-10cm, min.

Whip Planting

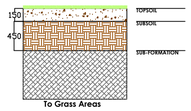


1. 1No. pointed cane driven into ground until firm.
2. Cane affixed into biodegradable brown spiral tree guard.
3. 300mm disk of mulch (50mm deep) around base.
4. Root ball notch planted with slow release fertiliser and watered until saturated.

EARTHWORKS DETAILS

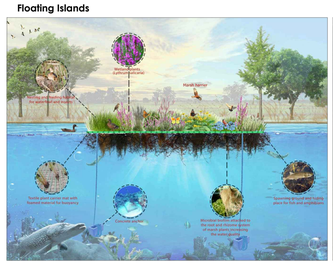


Tree Pits Areas

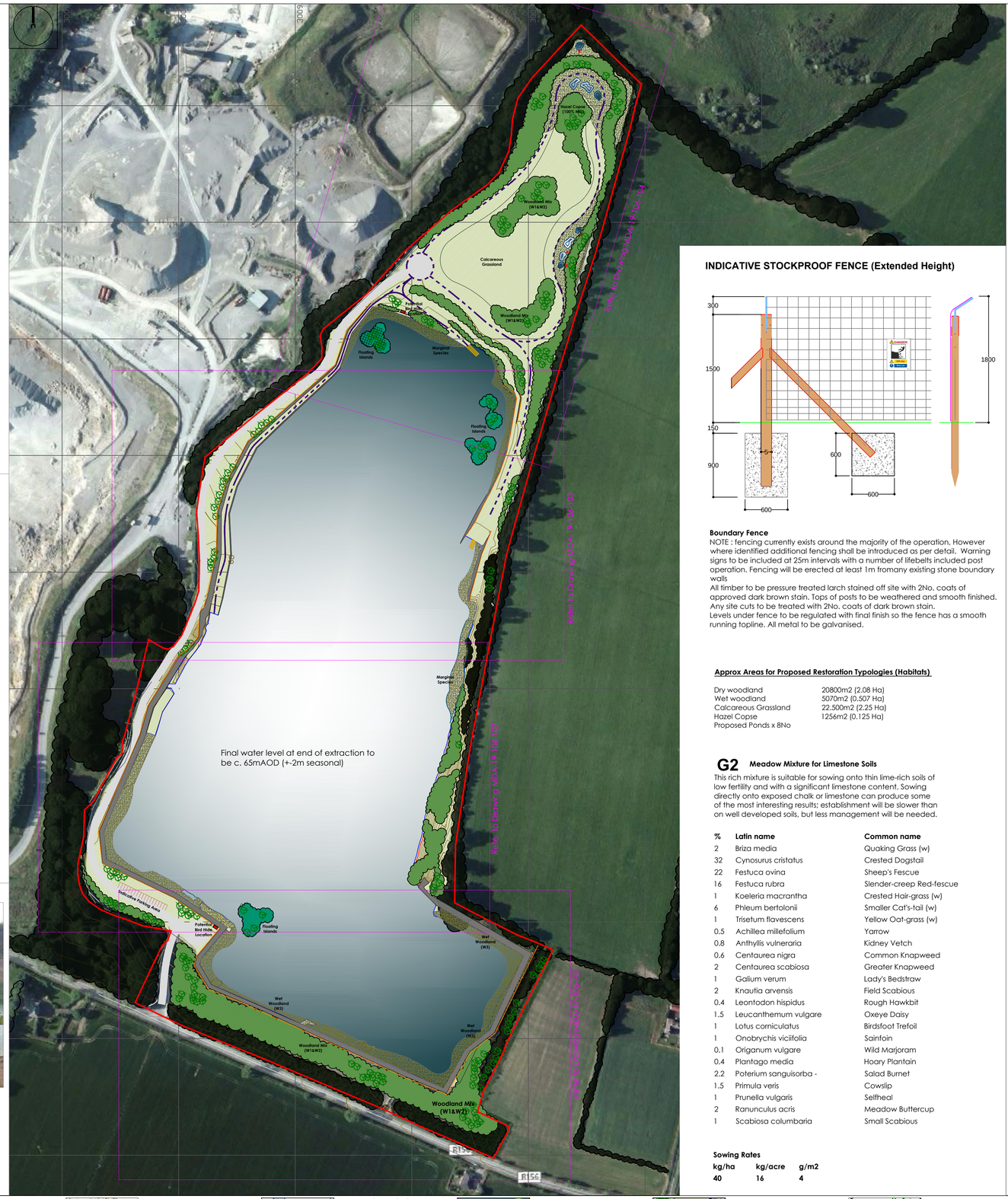


To Grass Areas

Floating Islands



W3	WET WOODLAND MIX			0.507Ha @2500 Plants Per Ha = 1267No	
%	SPECIES	SIZE	GROWN	HEIGHT/TRANSPL	NUMBER
20	Salix cinerea	40-60cm	BR / Cell	1 + 1 Branched	253
20	Betula pubescens	40-60cm	BR / Cell	1 + 1 Branched	253
20	Alnus glutinosa	40-60cm	BR / Cell	1 + 1 Branched	253
20	Prunus spinosa	40-60cm	BR / Cell	1 + 1 Branched	253
20	Salix fragilis	40-60cm	BR / Cell	1 + 1 Branched	253



INDICATIVE STOCKPROOF FENCE (Extended Height)

Boundary Fence
NOTE : fencing currently exists around the majority of the operation, However where identified additional fencing shall be introduced as per detail. Warning signs to be included at 25m intervals with a number of lifebelts included post operation. Fencing will be erected at least 1m fromany existing stone boundary walls
All timber to be pressure treated larch stained off site with 2No. coats of approved dark brown stain. Tops of posts to be weathered and smooth finished. Any site cuts to be treated with 2No. coats of dark brown stain.
Levels under fence to be regulated with final finish so the fence has a smooth running topline. All metal to be galvanised.

Approx Areas for Proposed Restoration Typologies (Habitats)

Dry woodland	20800m2 (2.08 Ha)
Wet woodland	5070m2 (0.507 Ha)
Calcareous Grassland	22.500m2 (2.25 Ha)
Hazel Copse	1256m2 (0.125 Ha)
Proposed Ponds x 8No	

G2 Meadow Mixture for Limestone Soils

This rich mixture is suitable for sowing onto thin lime-rich soils of low fertility and with a significant limestone content. Sowing directly onto exposed chalk or limestone can produce some of the most interesting results; establishment will be slower than on well developed soils, but less management will be needed.

%	Latin name	Common name
2	Briza media	Quaking Grass (w)
32	Cynosurus cristatus	Crested Dogstail
22	Festuca ovina	Sheep's Fescue
16	Festuca rubra	Slender-creep Red-fescue
1	Koeleria macrantha	Crested Hair-grass (w)
6	Phleum bertolonii	Smaller Cat's-tail (w)
1	Trisetum flavescens	Yellow Oat-grass (w)
0.5	Achillea millefolium	Yarrow
0.8	Anthyllis vulneraria	Kidney Vetch
0.6	Centaurea nigra	Common Knapweed
2	Centaurea scabiosa	Greater Knapweed
1	Galium verum	Lady's Bedstraw
2	Knautia arvensis	Field Scabious
0.4	Leontodon hispidus	Rough Hawkbit
1.5	Leucanthemum vulgare	Oxeye Daisy
1	Lotus corniculatus	Birdsfoot Trefoil
1	Onobrychis viciifolia	Sainfoin
0.1	Origanum vulgare	Wild Marjoram
0.4	Plantago media	Hoary Plantain
2.2	Poterium sanguisorba -	Salad Burnet
1.5	Primula veris	Cowslip
1	Prunella vulgaris	Selfheal
2	Ranunculus acris	Meadow Buttercup
1	Scabiosa columbaria	Small Scabious

Sowing Rates

kg/ha	kg/acre	g/m2
40	16	4

W1	MAIN WOODLAND MIX 75%				2.08Ha @2500 Plants Per Ha = 5200No (3900)	
	%	SPECIES	COMMON	SIZE	GROWN	TRANSPLANTS	NUMBER
	Qr 35	Quercus robur	Oak	40-60cm	BR	1 + 2 Branched	1365
	Ps 15	Pinus sylvestris	Scots PIne	40-60cm	BR	1 + 1 Branched	585
	Bp 20	Betula pendula	Birch	40-60cm	BR	1 + 1 Branched	780
	Ag 15	Alnus glutinosa	Alder	40-60cm	BR	1 + 1 Branched	585
	Sa 10	Sorbus aucuparia	Rowan	40-60cm	BR	1 + 1 Branched	390
	Pa 5	Prunus avium	Cherry	40-60cm	BR	1 + 1 Branched	195
*	Fe	Fraxinus excelsior	Ash *	40-60cm	BR	1 + 1 Branched	

W2	WOODLAND EDGE MIX 25%					(1300)
	%	SPECIES	COMMON	SIZE	GROWN	TRANSPLANTS	NUMBER
	Ca 30	Corylus avellana	Hazel	40-60cm	BR	1 + 1 Branched	390
	Cm 15	Crataegus monogyna	Hawthorn	40-60cm	BR	1 + 1 Branched	195
	Ps 10	Prunus spinosa	Blackthorn	40-60cm	BR	1 + 1 Branched	130
	Ia 15	Ilex aquifolium	Holly	40-60cm	BR	1 + 1 Branched	195
	Qi 5	Acer campestre	Field Maple	40-60cm	BR	1 + 1 Branched	65
	Ue 5	Ulex europaeus	Gorse	40-60cm	BR	1 + 1 Branched	65
	Ag 5	Alnus glutinosa	Alder	40-60cm	BR	1 + 1 Branched	65
	Ms 5	Malus sylvestris	Crabapple	40-60cm	BR	1 + 1 Branched	65
	Vo 5	Viburnum opulus	Guelder Rose	40-60cm	BR	1 + 1 Branched	65
	Sci 5	Salix cinerea	Willow	40-60cm	BR	1 + 1 Branched	65

* Due to Ash back there is at time of submission a moratorium on specifying this species, however as resistant strains emerge over ther life of this operation it is expected that it will be possible to specify.

LIGHT STANDARD TREES

	%	SPECIES	COMMON	SIZE (girth)	HEIGHT	APP. STEM	NUMBER
Qr	50	Quercus robur	Oak	6-8cm	2.5-2.75m	1.5 - 1.8m	As Shown
Bp	25	Betula Pendula	Birch	6-8cm	2.5-2.75m	1.5 - 1.8m	
Ag	25	Alnus Glutinosa	Alder	6-8cm	2.5-2.75m	1.5 - 1.8m	

Restoration Concept

Restoration of this extractive operation is focused on habitat creation and delivering biodiversity. In addition it has been recognized there is long term potential to accommodate active and passive recreation - Walking, birdwatching, fishing etc.
This site could be assimilated with adjoining lands (particularly through the restoration of the adjoining quarry site to the west) to contribute to regional biodiversity.
Conectivity of this site within a region wide green infrastructure strategy should be explore by the Authorities.
The majority of the subject site will be occupied by water body and surrounded by calcareous grassland and native woodland (incl Hazel copse). New ponds with wetland areas would also be created. Sections of expose rock face would remain post operation and offer valuable nesting opportunities for birds (including raptors).
Restoration will be applied progressively on this site, therefore as areas reach their maximum extent of extraction rehabilitation would commence. Long term this site offers potential to create a diverse habitat - with similar examples of former quarry sites having become designated nature reserves.

Soil Management

Much of the soils and overburden layers at this quarry operation have in the past been stripped and relocated and are generally unavailable for restoration purposes. However some pockets of topsoils remain intact, which can be utilized for future restoration. Where soils (including stored soil) are identified, these should be appropriately transported to areas available for restoration.
Soil Stripping :- Stripping should apply guidance from MAFF data sheets.
Soil Storage :- Location of striped soils storage to be agreed on site - Storage berms should be clearly signed & protected. Storage Berm Height (maximum): 3m.
Handling Soils :-
- Aggressive weeds to to be topped and selectively herbicide added as required
- Give notice and obtain instructions before moving topsoil.
- Plant: Select and use plant to minimize disturbance, trafficking and compaction.
- Contamination: Do not mix topsoil with;
- Subsoil, stone, hardcore, rubbish or material from demolition work.
- Other grades of topsoil.
Multiple handling: Keep to a minimum. Use or stockpile topsoil as soon as possible after stripping.
Wet conditions: Handle topsoil in the driest condition possible. Do not handle during or after heavy rainfall or when it is wetter than the plastic limit less 3%, to BS 1377-2.
Spreading Soils:-
Temporary roads/surfacing: Broken and remove before spreading topsoil.
Layers: - Depth (maximum): 150 mm. - Gently firm each layer before spreading the next.
Depths after firming and settlement (minimum):
- Grass areas - 50mm (excluding wet wildflower grassland areas)
- Planted areas - 150mm. Crumb structure: Do not compact topsoil. Preserve a friable texture of separate visible crumbs wherever possible

Proposed Woodland Planting

Years 1-3 (Establishment)
Maintain shrub & woodland areas in a weed free condition (No herbicide application on site).
Prune minor damage back to healthy wood and check for and treat disease. Gap up to replace damaged or failed plant material in accordance with the original planting specification, which shall form part of the management documentation. Check protective fencing, where used, and maintain in good condition.
Year 4-10
As canopies merge, remove guards and stakes and cease weed control.
Thin out weakest specimens if planting becomes overcrowded and start to restrict growth.
1 no. basic-level inspection bi-annual by qualified professional (in autumn to coincide with fungal fruiting) to check physiological and biological condition -
At the end of this period determine if thinned to 5 m to maintain continued grassland cover beneath.
Felled trees to be used to create hibernatula
Year 11-20
1 no. basic-level inspection bi annual by qualified arboriculturist (in autumn to coincide with fungal fruiting) to check physiological and biological condition
Thin out weakest specimens every 5 years as planting becomes overcrowded and start to restrict growth.
Year 20+
1 no. basic-level inspection per annum by qualified arboriculturist (in autumn to coincide with fungal fruiting) to check physiological and biological condition
Interplant gaps and openings with new transplants every 5 years as required. Felled trees to be used to create hibernatula.

Proposed Grasslands

Preparation
Ground preparation should follow the supplier's instructions with the removal of weeds, rubbish and stones of over75 mm diameter. The seed will be sown following extraction activities during times of sufficient warmth and moisture, ideally in late spring or early autumn.
First year management
Most of the sown meadow species are perennial and will be slow to germinate and grow and will not usually flower in the first growing season. There will often be a flush of annual weeds from the soil in the first growing season. This weed growth is easily controlled by topping or mowing. (No herbicide applied on site)
Avoid cutting in the spring and early summer if the mixture is autumn sown and contains Yellow Rattle, or if the mixture has been sown with a nurse of cornfield annuals. These sown annuals should be allowed to flower, then in mid-summer cut and remove the vegetation. It is important to cut back the annuals before they die back, set seed and collapse: this cut will reveal the developing meadow mixture and give it the space it needs to develop.
Management once established
In the second and subsequent years sown areas can be managed in a number of ways which, in association with soil fertility, will determine the character of the grassland.
On poor shallow soils one or two cuts at the end of the summer, or occasional light grazing, may be all that is required to maintain diversity and interest.
On deeper soils best results are usually obtained by traditional meadow management based around a main summer hay cut in combination with autumn and possibly spring mowing or grazing. Meadow grassland is not cut or grazed from spring through to late July/August to give the sown species an opportunity to flower.
Refinement of options would tailor by the project ecologist and form part of future management plans.
After flowering in July or August take a 'hay cut': cut back with a scythe, petrol strimmer or tractor mower to c 50mm. Leave the 'hay' to dry and shed seed for 1-7 days then remove from site.
Mow or graze the re-growth through to late autumn/winter to c 50mm and again in spring if needed.

legend

- Planning Application Boundary
- Existing Hedgerows/ Scrub & Woodland
- Proposed Dry Woodland Planting (W1 & W2 - H1)
- Species Rich Dry Calcareous Grassland (G2)
- Proposed Wet Woodland (W3)
- Species Rich Wet Calcareous Grassland (G2)
- Proposed ponded area profiled & finished suitable for future amphibian habitation
- Proposed future birdhide location
- Anchored floating islands completed with riperian species
- Rock faces to be retained as potential habitat for nesting birds
- Approximate location of informal pathways & routes through site
- Marginal & emergent species with potential jetty locations
- Light Standard Trees
- Protective Fencing

client	date	scale	by	notes
Keegan Quarries	Jan 24	1:2000 @ A1 1:4000 @ A3	pjm	

Landscape Restoration
Tromman Quarry,Rathmoylan
Co. Meath.

MDA Fig 3.7
MDA 19-106-100

mda
mullin design associates
chartered landscape architects
559 Ormeau Road, Rosetta, Belfast BT7 3JA
mail@mullindesignassociates.com