Table 6 Species and their abundance within short turf good semi-improved grassland located in Gruffy Field NCA

Common Name	Species Name	Abundance (DAFOR)
Mouse-ear hawkweed	*Pilosella officinalis*	*VLA*
Spring sedge	*Carex caryophyllea,*	*LF*
Common bird's-foot trefoil	*Lotus corniculatus*	*LF*
Creeping cinquefoil	*Potentilla reptans*	*LF*
Self-heal	*Prunella vulgaris*	*O*
Rough hawkbit	*Leontodon hispidus*	*O*
Common ragwort	*Senecio jacobaea*	*O*
Autumn hawkbit	*Scorzoneroides autumnalis*	*O*
Lady's bedstraw	*Galium verum*	*O*
Crested dog's-tail	*Cynosurus cristatus*	*F*
Sweet vernal-grass	*Anthoxanthum odoratum*	*F*
Rough meadow-grass	*Poa trivialis*	*O*
Perennial rye-grass	*Lolium perenne*	*O*
Cock's-foot	*Dactylis glomerata*	*O*
Salad burnet	*Poterium sanguisorba*	*O*
Glaucous sedge	*Carex flacca*	*O*
Hoary plantain	*Plantago media*	*O*
Black medick	*Medicago lupilina*	*O*
Fescue	*Festuca sp.*	*F*
Red clover	*Trifolium pratense*	*O*
Common sorrel	*Rumex acetosella*	*LF*

2.6.4 Downside Meadows (Nature Trail NCA) comprises a tall and tussocky semi-improved sward with a significant litter layer. The predominant species in the sward at frequent abundance included false oat-grass, cock's-foot, Yorkshire fog and red fescue. Grass species present at occasional abundance included tall fescue, sweet vernal grass, common bent and upright brome. Common couch *Elymus repens* is present in locally frequent patches. Along the southern boundary, the grassland grades into a stand of tall ruderal vegetation through lack of management, dominated by hogweed and nettle *Urtica dioica*. Frequent or locally frequent forb species include black knapweed *Centaurea nigra*, common sorrel *Rumex acetosa*, meadow vetchling *Lathyrus pratensis* and field bindweed. Occasional species include ribwort plantain, meadow buttercup *Ranunculus acris*, and common ragwort. Rare forb species include bush vetch *Vicia sepium* and betony *Stachys officinalis*.

Table 7 Species and their abundance within good semi-improved grassland at Downside Meadows (Nature Trail NCA)

Scientific name	English name	DAFOR
Arrenatherum elatius	*False oat-grass*	*F*
Dactylis glomerata	*Cock's-foot*	*F*
Holcus lanatus	*Yorkshire fog*	*F*
Festuca rubra	*Red fescue*	*F*
Elytrigia repens	*Common couch*	*LF*
Agrostis capillaris	*Common bent*	*O*
Anthoxanthum odoratum	*Sweet vernal-grass*	*O*
Bromopsis erecta	*Upright brome*	*O*
Schedonorus arundinacea	*Tall fescue*	*O*
Heracleum sphondylium	*Hogweed*	*F*

Scientific name	English name	DAFOR
Urtica dioica	*Common nettle*	*LF*
Centaurea nigra	*Common knapweed*	*F*
Convolvulus arvensis	*Field bindweed*	*F*
Rumex acetosa	*Sorrel*	*F*
Lathyrus pratensis	*Meadow vetchling*	*LF*
Rumex crispus	*Curled dock*	*LF*
Plantago lanceolata	*Ribwort plantain*	*O*
Achillea millefolium	*Yarrow*	*O*
Cirsium arvense	*Creeping thistle*	*O*
Anthriscus sylvestris	*Cow parsley*	*O*
Ranunculus acris	*Meadow buttercup*	*O*
Senecio jacobaea	*Common ragwort*	*O*
Potentilla anserina	*Silverweed*	*R*
Vicia sepium	*Bush vetch*	*R*
Stachys officinalis	*Betony*	*R*

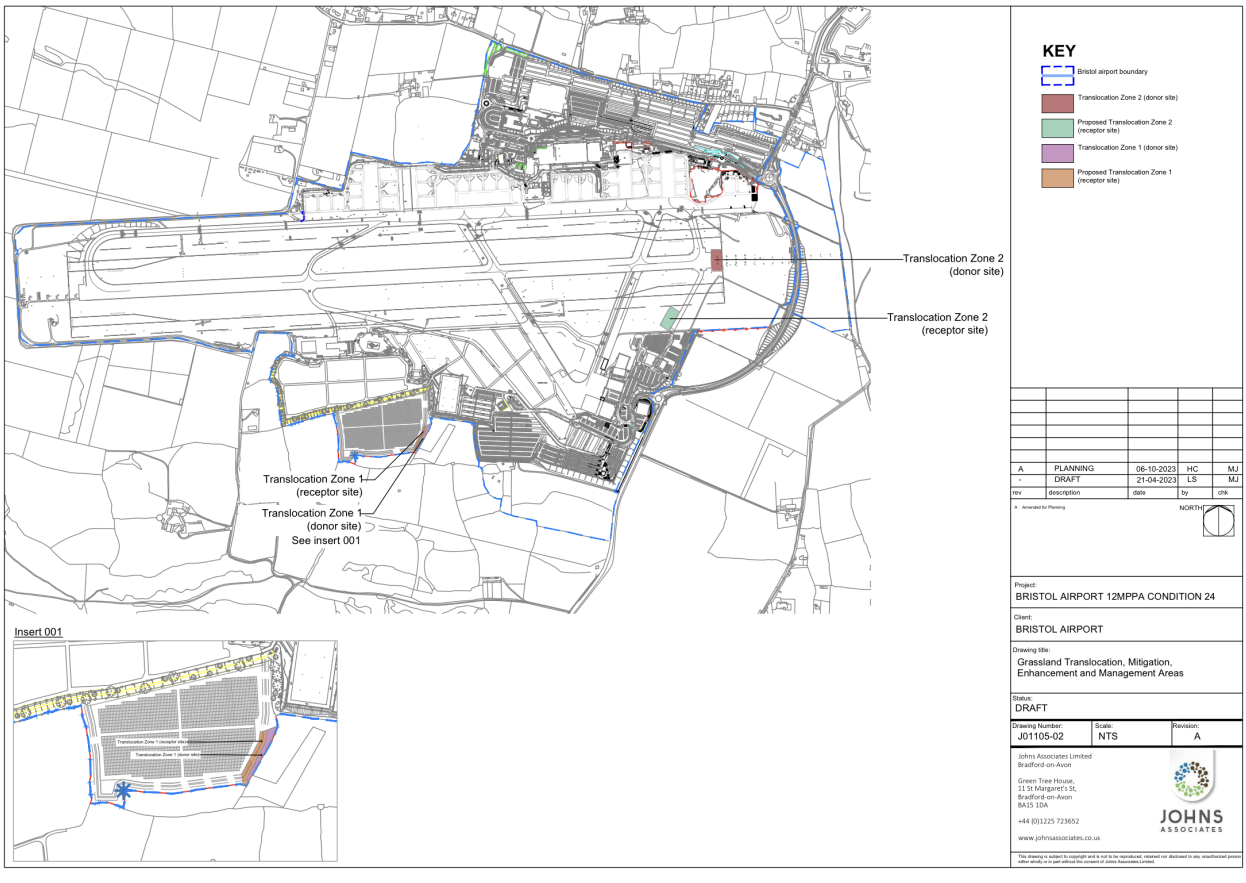
3 Grassland Translocation Required for 12mppa (Planning Condition 24)

3.1 Overview

3.1.1 Figure 2 illustrates the two grassland translocations areas, showing the donor sites (affected by the 12mpppa development activity) and the associated nearby receptor sites.

3.1.2 Grassland Translocation Zone 1 is associated with good semi-improved neutral grassland, with forb species which may indicate slightly calcareous soils (see Section 1.1.5 above). This is located on sloping ground to the south eastern edge of the Silver Zone Extension 2 (Cogloop 2). The development and landscape plan for this additional long-stay carparking has enabled the retention *in situ* of a good proportion of this grassland. The remaining area of the good semi-improved grassland will be removed as turves while the perimeter bund in that area is constructed and then replaced onto the outer face of the bund within 24 hours, replicating the slope direction and therefore associated aspect/soil hydrology associated with the current donor site. The underlying soil of the receptor site will be sourced from the donor site thereby replicating the soil type, pH and other characteristics.

3.1.3 Grassland Translocation Zone 2 is associated with a small area (0.25ha) of good semi-improved neutral grassland, with forb species which may indicate slightly calcareous soils located at the eastern end of the runway. The donor site is flat and centrally located in the open airfield grassland. The grassland from the donor site will be removed as turves and directly translocated to a prepared flat receptor site located 150m to the south west, adjacent to a minor taxiway matched exactly to an 0.25ha equivalent prepared area located on poor semi-improved neutral grassland and exactly the same soil typology. The poor semi-improved grassland turf will be removed and incorporated into the general soil associated with the wider Silver Zone Extension 2 (Cogloop 2) landscape bund.



3.2 Turf Translocation protocol

Safety and Compliance Considerations

3.2.1 The turf translocation zone 2 is located in the 27 undershoot 09 Climb-out RESA (Runway End Safety AREA) which are safeguarded for critical stages of flight. However, this can be managed as part of the proposed Taxiway Link project by additional bird dispersal measures being deployed by Airside Ops and backfilling exposed soil with a suitable inert material to exclude birds access to the soil and invertebrates or reinstatement of turves from the receptor site.

3.2.2 Apart from the potential wildlife strike issues, the reinstatement will have to ensure the areas complies with the requirements of a RESA for operating off runway 09 and aircraft performance calculations whilst work in on progress.

3.2.3 Should these considerations prove to be insurmountable, Bristol Airport would liaise closely with North Somerset Council to identify alternatives.

3.2.4 All works would be supervised by a suitably qualified ecologist and undertaken by a suitably experienced contractor.

Soil Preparation

3.2.5 These works would be supervised by a suitably qualified ecologist.

3.2.6 It is of vital importance that the topography of the mitigation (receptor) areas is designed to replicate the existing physical aspects of the donor areas. The levels of soils must also match the levels of surrounding soils to create an appropriate drainage regime. The soil associated with the receptor areas will match that of the donor – based on the fact that these either coincide with or are very closely located and are of the same soil type/character.

3.2.7 Existing turf will be removed to match the depth of turf being translocated (20-40cm deep depending topsoil depth associated with the donor turves) and returned to the donor site to ensure excludes birds from being attracted to the exposed soil.

3.2.8 The receptor site will be suitably prepared in advance to receive cut turves immediately.

3.2.9 In line with general good practice, the soil of the receiving will area be thoroughly cultivated before attempting any restoration. This will break up the soil to prevent the creation of a pan (or remove any existing pans). If the whole-creation process encounters bad weather, subsoiling the site at the end of the operation may be necessary to remove any pans or crusts created by the trafficking on the soil. This operation should however, be done only if necessary.

Timing

3.2.10 Turf translocation will only be conducted during the appropriate period i.e November to April inclusive, excluding periods where frost/frozen or waterlogged ground is present.

3.2.11 This timescale applies to each of the individual translocations phases (Extension of Silver Zone Phase 2 between January to late April 2024 and the separate airfield translocation – timing to be confirmed).

Translocation

3.2.12 These works would be supervised by a suitably qualified ecologist.

3.2.13 The grassland to be translocated will be cut short to prevent the weight of vegetation compromising the integrity of the turf.

3.2.14 Translocation works will be restricted to the vegetation dormant season (i.e. late autumn to late spring and over winter subject to ground conditions).

3.2.15 Turves are to be cut with a vertical blade to create clean cut edge to the turf. This may be a smooth blade or guillotine but not a toothed bucket.

3.2.16 Turves are to be as large as practicable (e.g. 1.2m2 and between 20-40cm deep) depending on topsoil depth at the site. The depth must be agreed prior to translocation with a suitably qualified ecologist. Turf depth is determined by root structure and to a lesser extent the soil characteristics. Turf depth will follow the maximum rooting depth and is typically expected to be around 200 mm deep on this site based on the results of soil sampling previously carried out at the airport. Attempts to cut turves deeper than the root zone are counter-productive as subsoil poorly connected to the topsoil and rootmass crumble away unevenly leaving voids beneath the laid turf.

3.2.17 The turves are to be cut and lifted in one operation.

3.2.18 A flatbed agricultural trailer will be used to transport multiple turves.

3.2.19 Cut turves are not to be stored.

3.2.20 Abut the turfs as close together as possible without gaps and with an even surface (to avoid plant root desiccation and plant death).

3.2.21 Where possible, turves will be re-laid in the same order as taken from the donor site, to preserve the vegetation sub-community patterns of the donor site.

3.2.22 Any gaps between turves will be carefully infilled with subsoil from the donor site.

3.2.23 The turves will be in full contact with the surface beneath – this will be confirmed through by tamping gently with the digger bucket.

3.2.24 Translocated turves will be watered immediately after translocation. Further watering will be implemented if prolonged dry weather is encountered.

3.2.25 The translocated grassland habitats will not require any immediate aftercare associated with the translocation process, such as watering. The principles for aftercare management will include the following as necessary:

- Mowing
- Control undesirable or invasive plant species) by hand-pulling, cutting/ flailing or with herbicides, depending on the species and the level of the problem.
- Consider the need to 'top up' with plug plants/additional seed if establishment is poor and too much bare ground remains, particularly in the topsoil strip areas.

3.2.26 Annual management will be informed by regular visual inspections and condition assessments by a suitably qualified ecologist in order to assess what management operations are required and where.

4 Grassland Mitigation, Enhancement and Management

4.1 Introduction

4.1.1 The management and routine maintenance of grassland at Bristol Airport will be the responsibility of the airport's in-house skilled maintenance team supporting by suitably experienced ecologists, landscape architects and agronomists. The maintenance team will continue to actively liaise and respond to the vegetation management requirements of the airfield operator with respect of any specifically identified hazards that are identified by the airfield operator and its technical advisors. There will be mechanisms put in place to ensure the prompt implementation of remedial action as required by both parties, including liaison with North Somerset Council, and where appropriate, Natural England.

4.1.2 The maintenance team will use this document as a guide to review and updating their grassland maintenance plans where needed. In doing this, they will incorporate any specific measures such as timings, frequency or techniques set out in this document. Where these details are not given, there is flexibility and scope for them to use their experience as a land manager, judgement and specific resources available to them to decide on the most appropriate course of action (e.g. machinery/equipment or specific skilled resource).

4.2 Grassland at Bristol Airport

4.2.1 Figure 2 (and Appendix C) illustrates the arrangement of the different grassland mitigation, enhancement and management areas at Bristol Airport that are addressed by this document. The proposed grassland mitigation, enhancement and management proposed for each of these areas is set out in the rest of Section 4. These measures have been selected to compliment the type of lowland grassland present (grazed or mown / semi-natural and semi-improved) and to promote greater botanical and/or invertebrate diversity, providing many species with a greater prey assemblage, whilst meeting safeguarding requirements.

4.3 Airfield Grassland

4.3.1 The airport is subject to strict compliance with CAP 772: Wildlife Hazard Management at Aerodromes (Civil Aviation Authority, 2014) and this places particular restrictions for the management of wildlife habitats on and adjacent to the airport. This restriction prevents the management required to promote species rich grassland within the airfield as a shorter sward must be maintained and the grasses and taller herbs (<10cm) are therefore prevented from setting seed and subject to regular disturbance from mowing.

4.3.2 Bristol Airport's airfield grass management policy seeks to maintained the grass at a height of 250-300mm with minimal levels of weed infestation to reduce the presence of waterfowl and grassland plovers (e.g., Canada geese and lapwings), as well as passerines (e.g., corvids and starlings), gulls and pigeons. This is known as a Long Grass Policy (LGP) and is adopted by Bristol Airport for all of the larger grass islands. The LGP is intended to produce a healthy, erect, dense sward of grass, which is free from weeds.

4.3.3 Shorter grass lengths are required on some specific areas of the airfield, for various reasons.

4.3.4 Bristol Airport has establish an annual maintenance programme for all grass areas, which require on-going monitoring throughout the year. The programme is flexible to take account of local climatic conditions.

4.4 Public Realm Grassland

4.4.1 Public realm amenity/improved grassland at Bristol Airport is located in small areas within the north side terminal and car park areas, and at localised areas within the Silver Zone. These are typically closely mown by a contractor on behalf of Bristol Airport.

4.5 Nature Trail NCA

4.5.1 This is an existing NCA. Whilst it will be enhanced through the provision of a certain number of trees to create a 'parkland' environment, the grassland management will continue as per existing requirements. Annual monitoring will confirm its condition and inform whether management needs to be altered.

4.5.2 Weeds and ruderal species will be removed up to 2 months before further management/tree planting and areas of associated bare ground will be cultivated to between 100-250mm to a fine tilth. This will allow remaining weeds to germinate and then be controlled. These areas will be reseeded with Emorsgate EM2 'Standard General Purpose Meadow Mix' in late August or September. Seeding will be broadcast by hand with the sown seeds being raked or harrowed into the top 3mm of the soil and then rolled.

4.5.3 The mown nature trail will be enhanced and education boards upgraded to reflect the enhanced proposals for this area.

4.6 Eastern Stand Grassland

4.6.1 This area comprises retained turf, translocated semi improved grassland turf, hydroseeded areas and areas overseeded by hand, associated with the LEMP for planning permission 18/P/3950/FUL. Management will continue as current. Monitoring will identify the requirement for enhancements to species diversity.

Habitat / Vegetation Type	Management Objective
Neutral grassland (retained, translocated and re-seeded)	Generally - to manage height of vegetation for biodiversity value and in compliance with CAA CAP 772 guidance. To monitor wildflower, grass species, and hedgerow species and tree species diversity to assess appropriate ongoing management regime to ensure compatibility between maintaining biodiversity value, ensuring no net loss from the development/operation of this area and CAP772; Manage through bi-annual cutting. Arisings to be removed. Where necessary ragwort to be removed by hand pulling, and invasive scrub to be spot treated or hand pulled.

4.6.2 Where over-seeding of wildflower seed is required, method of distribution to be dispersal by hand unless otherwise agreed by Bristol Airport / Ecologist. For areas to be overseeded by hand, to be by conventional sowing technique - by hand, back mounted spreader or tractor/other machine spreader. To be carried out in autumn window when the grass sward is more open and less aggressive.

4.6.3 Where over-seeding with wildflower seed, use suitable seed mix to enhance the existing plant communities as well as meeting specific requirements for airfield safeguarding under CAP722, using following mix or similar approved;

Wild Flower Seed Mix:

5.00%	Birdsfoot Trefoil	Lotus corniculatus
8.00%	Black Knapweed	Centaurea nigra
5.00%	Black Medic	Medicago lupilina Yellow
5.00%	Common Vetch	Vicia sativa
7.00%	Meadow Buttercup	Ranunculus acris
4.00%	Musk Mallow	Malva moschata
12.00%	Ox Eye Daisy	Leucanthemum vulgare
8.00%	Red Campion	Silene dioca
12.00%	Ribwort Plantain	Plantago lanceolata
13.00%	Self Heal	Prunella vulgaris purple
15.00%	White Campion	Silene alba White
6.00%	Yarrow	Achillea millefolium

4.6.4 Wildflower seed to be sown using a 'carrier' ie silver sand or similar approved, to bulk out the seed, to improve ease of sowing, even distribution and to help indicate where the seed has been sown. Prior to over-seeding into existing sward cut grass (to height of 50-100mm, harrow/rake (to create approximately fifty percent bare soil) before broadcasting. Seed to be raked into the soil surface and lightly rolled to improve likelihood of germination.

4.6.5 Should any replacement sowing be necessary elsewhere, use approved seed mix as specified by airfield agronomist, (seed mix below) to complement the surrounding grassland species composition.

Grass mix:

75.%	Strong Creeping Red Fescue	Festuca rubra rubra
10%	Hard Fescue	Festuca trachyphylla
10%	Smooth Stalked Meadow Grass	Poa pratensis
5%	Highland Browntop Bent	Agrostis castellana

4.6.6 Where reinstatement of grassland is required in spring, any spring-sown grass should be cut after approximately six weeks, and then only when the vegetation exceeds 200mm. Do not apply fertilisers.

4.6.7 Where reinstatement of grassland is required in autumn this should not require management until spring (ideally February/March), when vegetation taller than 150mm should be cut back to 100mm and all cut material removed to prevent young plants from being smothered.

4.6.8 Where re-seeding of grassland is required, method of distribution to be agreed by Bristol Airport / Ecologist. To be carried out by hydroseeding, direct drilling or dispersed by hand. Method to be approved by Bristol Airport and airfield agronomist prior to reseeding.

4.7 Gruffys Field NCA

4.7.1 This area will continue to be cattle grazed to provide opportunities for invertebrates, notably prey for greater and lesser horseshoe bats.

4.8 Pasture to the East A38 NCA

4.8.1 The current management regime receive is based on 3-4 topping cuts to 320mm a year, initially after seed heads of the grass have emerged. This is carried out by Airside Operations using a pasture topper.

4.8.2 Apart from the far northern paddock within this NCA, (where overseeding can occur throughout), the proposed enhancement through scarifying and over-seeding of wildflower seed will occur within a 5m wide perimeter buffer and not directly under the flight path. This is to minimise risk due to departing and arriving aircraft not directly under the flight path. The method of distribution to be dispersal by hand unless otherwise agreed by Bristol Airport / Ecologist. For areas to be overseeded by hand, ground to be scarified first, and then seed applied by conventional sowing technique - by hand, back mounted spreader or tractor/other machine spreader. To be carried out in autumn window when the grass sward is more open and less aggressive.

4.8.3 Where over-seeding with wildflower seed, a suitable seed mix will be used to enhance the existing plant communities as well as meeting specific requirements for airfield safeguarding under CAP722, using following mix or similar approved;

Wild Flower Seed Mix:

5.00%	Birdsfoot Trefoil	Lotus corniculatus
8.00%	Black Knapweed	Centaurea nigra
5.00%	Black Medic	Medicago lupilina Yellow
5.00%	Common Vetch Vicia sativa	
7.00%	Meadow Buttercup	Ranunculus acris
4.00%	Musk Mallow	Malva moschata
12.00%	Ox Eye Daisy	Leucanthemum vulgare
8.00%	Red Campion	Silene dioca
12.00%	Ribwort Plantain	Plantago lanceolata
13.00%	Self Heal	Prunella vulgaris purple
15.00%	White Campion	Silene alba White
6.00%	Yarrow	Achillea millefolium

4.8.4 Wildflower seed to be sown using a 'carrier' ie silver sand or similar approved, to bulk out the seed, to improve ease of sowing, even distribution and to help indicate where the seed has been sown. Prior to over-seeding into existing sward cut grass (to height of 50-100mm, harrow/rake (to create approximately fifty percent bare soil) before broadcasting. Seed to be raked into the soil surface and lightly rolled to improve likelihood of germination.

4.8.5 Should any replacement sowing be necessary elsewhere, use approved seed mix as specified by airfield agronomist, (seed mix below) to complement the surrounding grassland species composition.

Grass mix:

75.%	Strong Creeping Red Fescue	Festuca rubra rubra
10%	Hard Fescue	Festuca trachyphylla
10%	Smooth Stalked Meadow Grass	Poa pratensis
5%	Highland Browntop Bent	Agrostis castellana

4.8.6 Where reinstatement of grassland is required in spring, any spring-sown grass should be cut after approximately six weeks, and then only when the vegetation exceeds 200mm. Do not apply fertilisers.

4.8.7 Where reinstatement of grassland is required in autumn this should not require management until spring (ideally February/March), when vegetation taller than 150mm should be cut back to 100mm and all cut material removed to prevent young plants from being smothered.

4.8.8 Where re-seeding of grassland is required, method of distribution to be agreed by Bristol Airport / Ecologist. To be carried out by hydroseeding, direct drilling or dispersed by hand. Method to be approved by Bristol Airport and airfield agronomist prior to reseeding.

4.9 Silver Zone Bund NCA

4.9.1 This is an existing NCA formed when the Silver Zone was constructed. It comprises areas of seeded semi-improved grassland with a variety of forbs, alongside ruderal species and a range of woody trees and shrubs.

4.9.2 Ongoing management of this area will involve cutting grass and non-woody species in late July and again in September to continue to promote grassland / flowering species diversity, with arisings removed and composted locally at Bristol Airport.

4.10 Silver Zone Extension 1 Bund NCA

4.10.1 This is an existing NCA formed when the Silver Zone Extension 1 (Cogloop 1) was constructed. It comprises areas of seeded semi-improved grassland with a variety of forbs, alongside ruderal species and a range of woody trees and shrubs.

4.10.2 Ongoing management of this area will involve cutting grass and non-woody species in late July and again in September to continue to promote grassland / flowering species diversity, with arisings removed and composted locally at Bristol Airport.

4.11 Silver Zone Extension 2 Bund NCA

4.11.1 Hydroseeding (hydraulic mulch seeding) is the process of spraying a specially mixed slurry comprising of water, seed, hydro-mulch, fertiliser plus additional products such as tackifying agents/binders in just one operation.

4.11.2 Individual mixtures (species rich grassland species mix) can be applied with a variety of different hydro-mulches; wood fibre, paper etc, together with organic tackifiers, and trace elements to establish vegetation. The mulch significantly reduces the risk of weed species colonising the bare ground before the target species can germinate and establish.

4.11.3 Additives to the hydroseed mix such as plant hormones, additional erosion control tackifier, soil amendments and microbial bacteria, enhance germination establishment to create the ideal growing environment that increases moisture retention, aids soil stabilisation, provides valuable nutrients and helps fight disease.

4.11.4 The desired seed mixture (Meadow Mixture For Chalk And Limestone Soils EM6) sown on to nutrient poor subsoil would be applied in a base mulch such as Conwed Hydromulch 1000 at a rate of 250g/m2 plus Tacking Agent 3 (or similar tackifier) to prevent wind drift.

4.11.5 EM6 is a complete mix composed of 20% native wild flowers and 80% slow growing grasses (by weight). The flower and grass components are also available to order separately as EM6F for the flower component and EG6 for the grass component.

Wild Flowers 20%

0.6 Achillea millefolium – Yarrow

0.5 Anthyllis vulneraria – Kidney Vetch

2.0 Centaurea nigra – Common Knapweed

0.5 Centaurea scabiosa – Greater Knapweed

0.1 Daucus carota – Wild Carrot

0.4 Galium album – (Galium mollugo) – Hedge Bedstraw

0.7 Galium verum – Lady's Bedstraw

0.3 Geranium pratense – Meadow Crane's-bill

0.2 Hippocrepis comosa – Horseshoe Vetch

0.1 Knautia arvensis – Field Scabious

0.1 Leontodon hispidus – Rough Hawkbit

2.0 Leucanthemum vulgare – Oxeye Daisy – (Moon Daisy)

0.1 Linum catharticum – Fairy Flax

0.2 Lotus corniculatus – Birdsfoot Trefoil

2.0 Malva moschata – Musk Mallow

0.3 Medicago lupulina – Black Medick

2.0 Plantago lanceolata – Ribwort Plantain

2.3 Plantago media – Hoary Plantain

3.0 Poterium sanguisorba – (Sanguisorba minor) – Salad Burnet

0.2 Primula veris – Cowslip

0.5 Ranunculus acris – Meadow Buttercup

1.0 Rhinanthus minor – Yellow Rattle

0.1 Scabiosa columbaria – Small Scabious

0.8 Silene vulgars – Bladder Campion

Grasses 80%

2.4 Briza media – Quaking Grass (w)

2.4 Bromopsis erecta – Upright Brome (w)

0.24 Carex flacca – Glaucous Sedge

40.0 Cynosurus cristatus – Crested Dogstail

16.0 Festuca ovina – Sheep's Fescue

15.2 Festuca rubra – Red Fescue

2.0 Koeleria macrantha – Crested Hair-grass

1.76 Trisetum flavescens – Yellow Oat-grass (w)

4.11.6 The exact specification of the mulch mixture will require the input of the appointed specialist contractor and will be agreed with the Project Ecologist prior to application.

4.11.7 The window for application is February to May and is entirely dependent on weather conditions, particularly rainfall. This is the best time for the grassland species to germinate and establish correctly. A second sowing window is possible in early autumn but this is highly weather dependent and has less chance of success for all species within the seed mixture.

4.11.8 The principles for aftercare management will include the following as necessary:

- Mowing
- Control undesirable or invasive plant species) by hand-pulling, cutting/ flailing or with herbicides, depending on the species and the level of the problem.
- Consider the need to 'top up' with plug plants/additional seed if establishment is poor and too much bare ground remains, particularly in the topsoil strip areas.

4.11.9 Annual management will be informed by regular visual inspections and condition assessments in order to assess what management operations are required and where.

4.12 Semi- improved Calcareous Grassland NCA

This is an existing NCA. As such management will continue as per the current prescribed long grass strategy, but informed by the monitoring regime that will confirm whether any changes are required on a regular basis. The objective for the management of this area is to continue to increase the diversity and condition of the semi-improved calcareous grassland within this NCA.

5 Grassland Monitoring

5.1 Grassland Monitoring Targets and Regime

5.1.1 Given the managed and regulated nature of much of the grassland at Bristol Airport - the grassland condition being aspired to is 'Moderate' for airside/controlled areas of grassland (including the Land East of the A38 NCA) and 'Good' for all other areas (excluding the amenity grassland areas) – See Appendix D.

5.1.2 The following programme and specification of grassland monitoring will be undertaken at Bristol Airport and associated with all areas of grassland.

5.1.3 A programme of ongoing annual monitoring for ten years to be undertaken to monitor habitat recovery/development and management, to determine whether there is a need to 'top up' with additional seed if establishment is poor and too much bare ground remains (this is to reduce risk of a vigorous non-target species, such as ragwort, becoming established) and to manage potential conflicts with CAP772.

5.1.4 The proposed monitoring for existing, translocated and restored habitats will have two main aims:

- Monitoring to measure the establishment and condition of the translocated and created/enhanced habitats and to assess the relative success of the translocation and existing grassland diversity; and
- Ongoing visual inspections and condition inspections to inform site aftercare management and compliance with CAA CAP772.

5.1.5 The monitoring associated with these two different purposes is described below.

5.1.6 The purpose of the on-going visual condition assessments will be to inform the annual management decisions. Visual inspections will be undertaken at least every 1-2 months each year during the first 1-2 years following the habitat translocation/habitat creation, particularly during the growing season (March-October). This will decrease over time depending on the degree of establishment of the translocated habitats. Monitoring reports will be submitted to North Somerset Council at the end of each of the first two years of monitoring.

5.1.7 Annual monitoring in May/June will occur for the following 8 years after.

5.1.8 Particular attention will be paid to the presence and cover of negative indicator species, particularly excessive ragwort, bramble and invasive plant species. The condition assessment will also record attributes such as sward height and structure and that associated with the NCAs be compared to grassland habitat condition tables and Moderate or Good condition associated with the Defra Biodiversity Net Gain Metric (see Appendix D), subject to safety and security management associated with CAP772.

5.1.9 If the monitoring indicates that good progress is not being made towards meeting targets, a process of responding and intervening would be started. This would involve consultation with a suitably qualified ecologist to agree the best measures to put in place such as altered management timing and techniques or topping up with seed or plug plants.

5.1.10 Where cutting and strimming are required, care to be taken around shrub species to avoid damage to stems and emergent roots.

5.1.11 Management of grassland to include removal of notifiable/injurious/invasive weed species etc where agreed with Bristol Airport/ecologist and where safe to do so.

5.1.12 Regular monitoring of the airfield is carried out the specialist Airside Operations team

5.1 CAP 772 Grassland Habitat Management Intervention

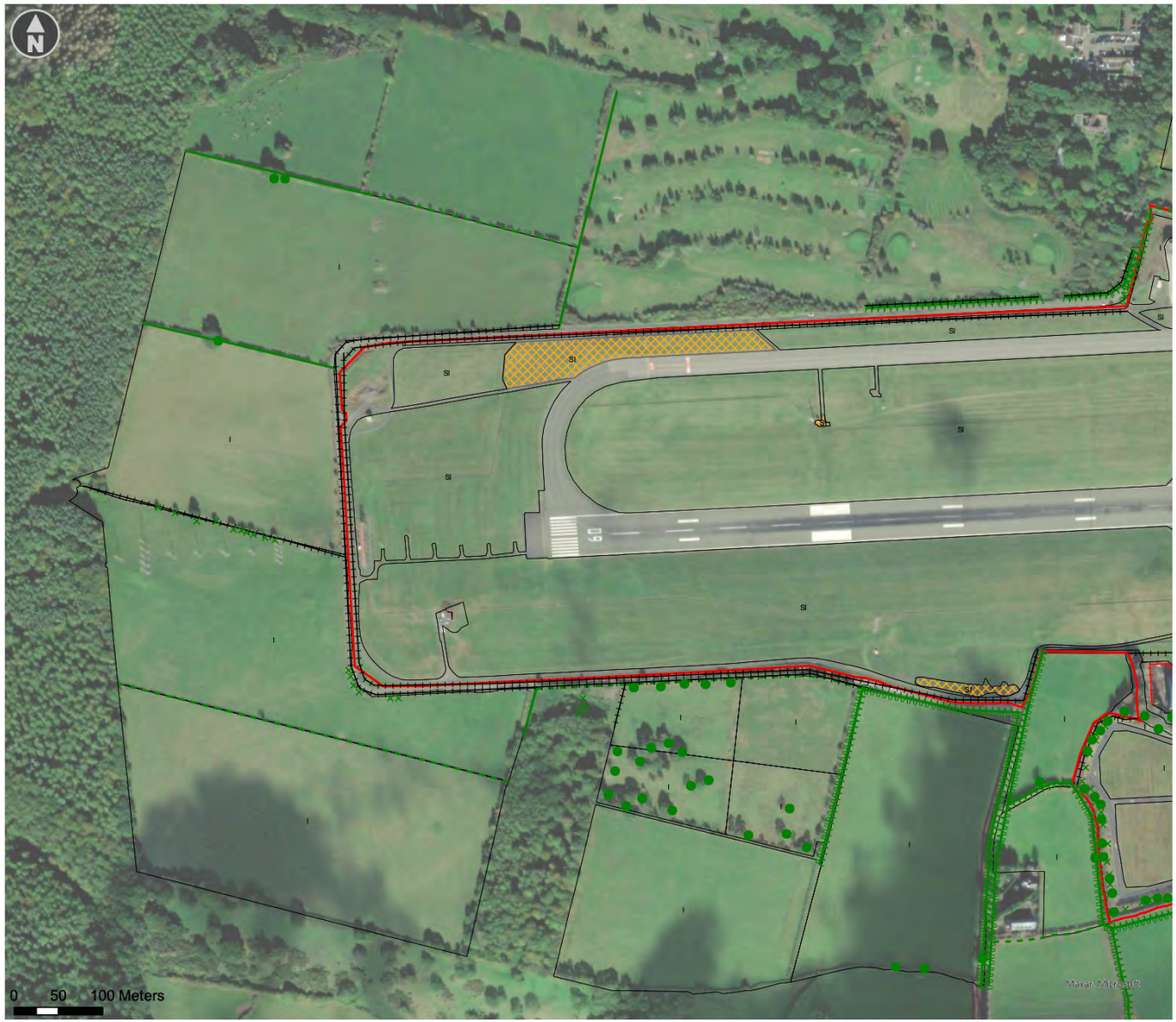
5.1.13 A traffic light system for grassland management intervention will be operated that will enable a data driven and proportionate response to ensure aviation safety is maintained (if necessary).

GREEN: No additional management required: the ongoing management of this area of grassland does not give rise to any safety concerns relating to aggregations or behavior of bird of species likely to increase the risk of birdstrike;

AMBER: Additional hand management of localised parts of the grassland (e.g. cut a stand of flowering ox-eye daisy down to 20cm) to reduce influence of bird attractant and remove risk and increase use of approved bird deterrents in this part of the airport. Notify North Somerset Council of management intervention, continue monitoring but maintain normal ongoing LEMP management.

RED: High risk identified from ASU monitoring and more extensive management is required. In this event, the hazard will be immediately managed/resolved by the Airside Operations team. Hazard data and justification of need for management intervention will be confirmed to North Somerset Council within 48 hours and an alternative future strategy will be sought and agreed with North Somerset Council. This may require removal of any high risk attractant area (e.g. use of herbicide) and subsequent re-seeding with a typical airfield mix, combined with grassland enhancement elsewhere at Bristol Airport.

APPENDIX A Current Grassland Distribution



JOHNS ASSOCIATES

- SiteBoundary
- B3.2 - Calcareous grassland - semi-improved
- B4 - Improved grassland
- B6 - Poor semi-improved grassland
- J2.1.1 - Intact hedge - native species-rich
- J2.1.2 - Intact hedge - species-poor
- J2.2.1 - Defunct hedge - native species-rich
- J2.2.2 - Defunct hedge - species-poor
- J2.4 - Fence
- J2.5 - Wall
- A2.2 - Scattered scrub
- A3.1 - Broadleaved tree

CLIENT Bristol Airport Limited

PROJECT Discharge of Planning Conditions 24 and 25

TITLE Phase 1 Habitat Map - Grasslands

SCALE @ A3	CREATED BY	CHECKED BY
1:4,000	CA	MJ
REFERENCE	**ISSUE/REVISION**	**DATE**
J01105-001		24/4/2023

JOHNS ASSOCIATES

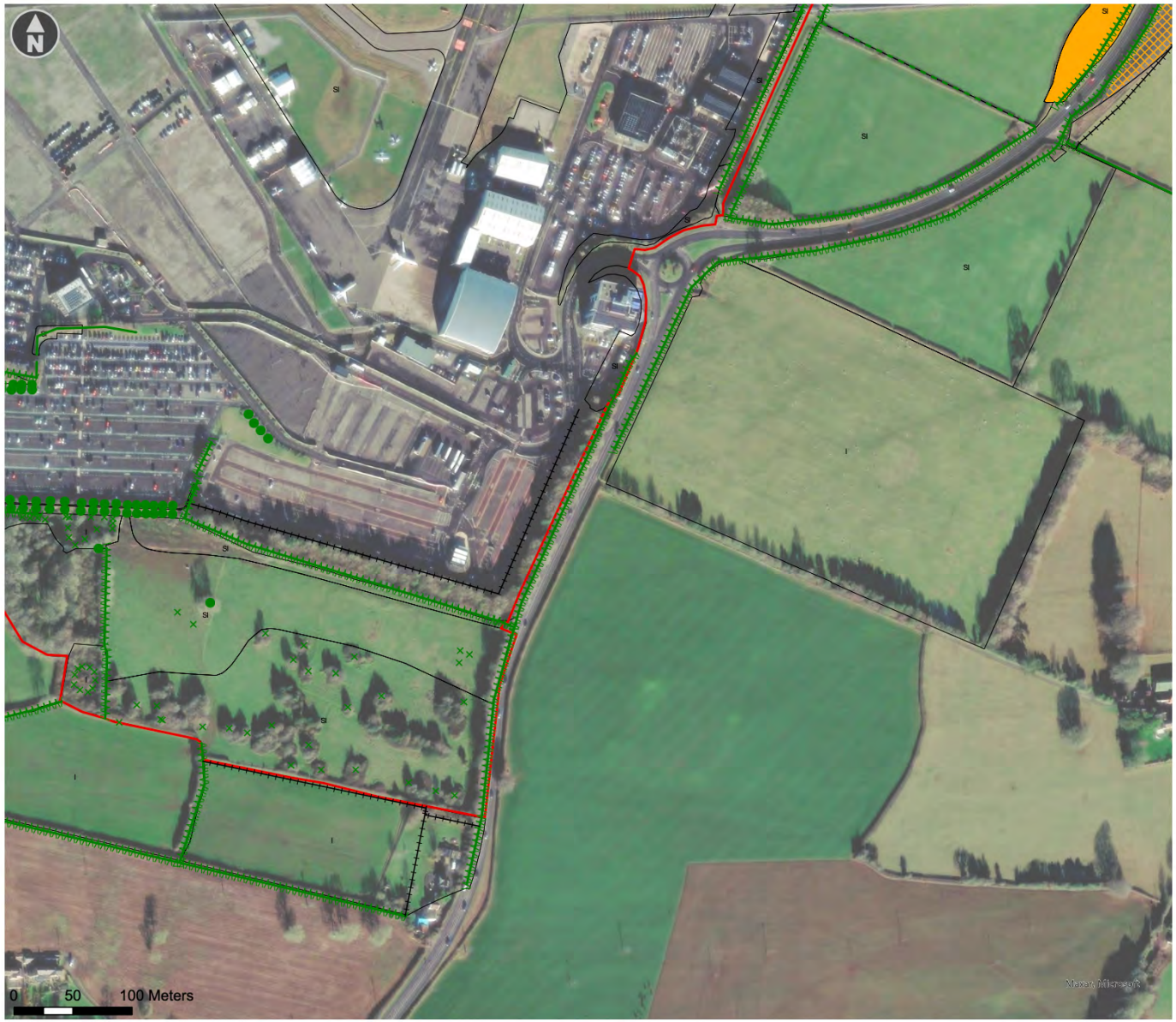
- SiteBoundary
- B2.2 - Neutral grassland - semi-improved
- B3.2 - Calcareous grassland - semi-improved
- B4 - Improved grassland
- B6 - Poor semi-improved grassland
- J2.1.1 - Intact hedge - native species-rich
- J2.1.2 - Intact hedge - species-poor
- J2.2.1 - Defunct hedge - native species-rich
- J2.2.2 - Defunct hedge - species-poor
- J2.4 - Fence
- J2.5 - Wall
- A2.2 - Scattered scrub
- A3.1 - Broadleaved tree
- A3.2 - Coniferous tree

CLIENT Bristol Airport Limited

PROJECT Discharge of Planning Conditions 24 and 25

TITLE Phase 1 Habitat Map - Grasslands

SCALE @ A3	CREATED BY	CHECKED BY
1:3,000	CA	MJ
REFERENCE	**ISSUE/REVISION**	**DATE**
J01105-002		24/4/2023



JOHNS ASSOCIATES

- SiteBoundary
- SI B2.2 - Neutral grassland - semi-improved
- SI B3.2 - Calcareous grassland - semi-improved
- I B4 - Improved grassland
- SI B6 - Poor semi-improved grassland
- J2.1.1 - Intact hedge - native species-rich
- J2.1.2 - Intact hedge - species-poor
- J2.2.2 - Defunct hedge - species-poor
- J2.4 - Fence
- A2.2 - Scattered scrub
- A3.1 - Broadleaved tree

CLIENT Bristol Airport Limited

PROJECT Discharge of Planning Conditions 24 and 25

TITLE Phase 1 Habitat Map - Grasslands

SCALE @ A3	CREATED BY	CHECKED BY
1:3,000	CA	MJ
REFERENCE	**ISSUE/REVISION**	**DATE**
J01105-003		24/4/2023

JOHNS ASSOCIATES

- SiteBoundary
- B2.2 - Neutral grassland - semi-improved
- B3.2 - Calcareous grassland - semi-improved
- B4 - Improved grassland
- B6 - Poor semi-improved grassland
- J2.1.1 - Intact hedge - native species-rich
- J2.1.2 - Intact hedge - species-poor
- J2.2.2 - Defunct hedge - species-poor
- J2.4 - Fence
- A2.2 - Scattered scrub
- A3.1 - Broadleaved tree

CLIENT Bristol Airport Limited

PROJECT Discharge of Planning Conditions 24 and 25

TITLE Phase 1 Habitat Map - Grasslands

SCALE @ A3	CREATED BY	CHECKED BY
1:3,000	CA	MJ
REFERENCE	**ISSUE/REVISION**	**DATE**
J01105-004		24/4/2023

JOHNS ASSOCIATES

- SiteBoundary
- B2.2 - Neutral grassland - semi-improved
- B3.2 - Calcareous grassland - semi-improved
- B4 - Improved grassland
- B6 - Poor semi-improved grassland
- J2.1.1 - Intact hedge - native species-rich
- J2.1.2 - Intact hedge - species-poor
- J2.2.2 - Defunct hedge - species-poor
- J2.4 - Fence
- J2.5 - Wall
- A2.2 - Scattered scrub
- A3.1 - Broadleaved tree

CLIENT Bristol Airport Limited

PROJECT Discharge of Planning Conditions 24 and 25

TITLE Phase 1 Habitat Map - Grasslands

SCALE @ A3	CREATED BY	CHECKED BY
1:2,000	CA	MJ
REFERENCE	**ISSUE/REVISION**	**DATE**
J01105-005		24/4/2023

JOHNS ASSOCIATES

- SiteBoundary
- SI B2.2 - Neutral grassland - semi-improved
- I B4 - Improved grassland
- SI B6 - Poor semi-improved grassland
- J2.1.1 - Intact hedge - native species-rich
- J2.1.2 - Intact hedge - species-poor
- J2.2.2 - Defunct hedge - species-poor
- J2.4 - Fence
- J2.5 - Wall
- A2.2 - Scattered scrub
- A3.1 - Broadleaved tree
- A3.2 - Coniferous tree

CLIENT Bristol Airport Limited

PROJECT Discharge of Planning Conditions 24 and 25

TITLE Phase 1 Habitat Map - Grasslands

SCALE @ A3	CREATED BY	CHECKED BY
1:3,000	CA	MJ
REFERENCE	**ISSUE/REVISION**	**DATE**
J01105-006		24/4/2023

JOHNS ASSOCIATES

- SiteBoundary
- B4 - Improved grassland
- B6 - Poor semi-improved grassland
- J2.1.1 - Intact hedge - native species-rich
- J2.1.2 - Intact hedge - species-poor
- J2.2.2 - Defunct hedge - species-poor
- A2.2 - Scattered scrub
- A3.1 - Broadleaved tree
- A3.2 - Coniferous tree

CLIENT Bristol Airport Limited

PROJECT Discharge of Planning Conditions 24 and 25

TITLE Phase 1 Habitat Map - Grasslands

SCALE @ A3	CREATED BY	CHECKED BY
1:2,000	CA	MJ
REFERENCE	**ISSUE/REVISION**	**DATE**
J01105-007		24/4/2023

JOHNS ASSOCIATES

- SiteBoundary
- I B4 - Improved grassland
- SI B6 - Poor semi-improved grassland
- J2.1.1 - Intact hedge - native species-rich
- J2.1.2 - Intact hedge - species-poor
- J2.2.1 - Defunct hedge - native species-rich
- J2.2.2 - Defunct hedge - species-poor
- J2.4 - Fence
- A2.2 - Scattered scrub
- A3.1 - Broadleaved tree
- A3.2 - Coniferous tree

CLIENT Bristol Airport Limited

PROJECT Discharge of Planning Conditions 24 and 25

TITLE Phase 1 Habitat Map - Grasslands

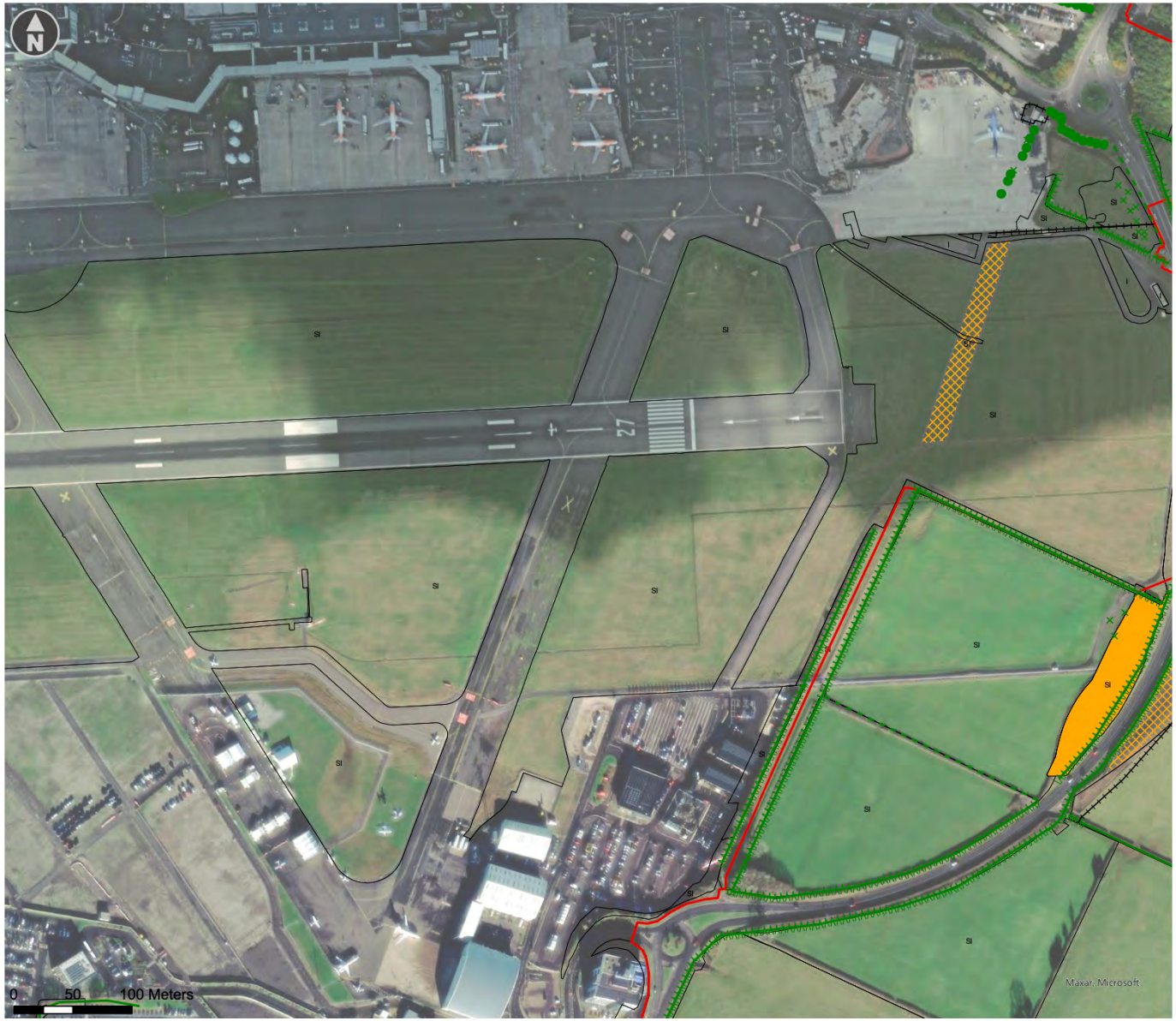
SCALE @ A3	CREATED BY	CHECKED BY
1:3,000	CA	MJ
REFERENCE	**ISSUE/REVISION**	**DATE**
J01105-008		24/4/2023

JOHNS ASSOCIATES

- SiteBoundary
- B3.2 - Calcareous grassland - semi-improved
- B4 - Improved grassland
- B6 - Poor semi-improved grassland
- J2.1.1 - Intact hedge - native species-rich
- J2.2.1 - Defunct hedge - native species-rich
- J2.2.2 - Defunct hedge - species-poor
- J2.4 - Fence
- J2.5 - Wall
- A2.2 - Scattered scrub
- A3.1 - Broadleaved tree

CLIENT	Bristol Airport Limited
PROJECT	Discharge of Planning Conditions 24 and 25
TITLE	Phase 1 Habitat Map - Grasslands

SCALE @ A3	CREATED BY	CHECKED BY
1:3,000	CA	MJ
REFERENCE	**ISSUE/REVISION**	**DATE**
J01105-009		24/4/2023



JOHNS ASSOCIATES

- SiteBoundary
- SI B2.2 - Neutral grassland - semi-improved
- SI B3.2 - Calcareous grassland - semi-improved
- I B4 - Improved grassland
- SI B6 - Poor semi-improved grassland
- J2.1.1 - Intact hedge - native species-rich
- J2.1.2 - Intact hedge - species-poor
- J2.2.2 - Defunct hedge - species-poor
- J2.4 - Fence
- A2.2 - Scattered scrub
- A3.1 - Broadleaved tree

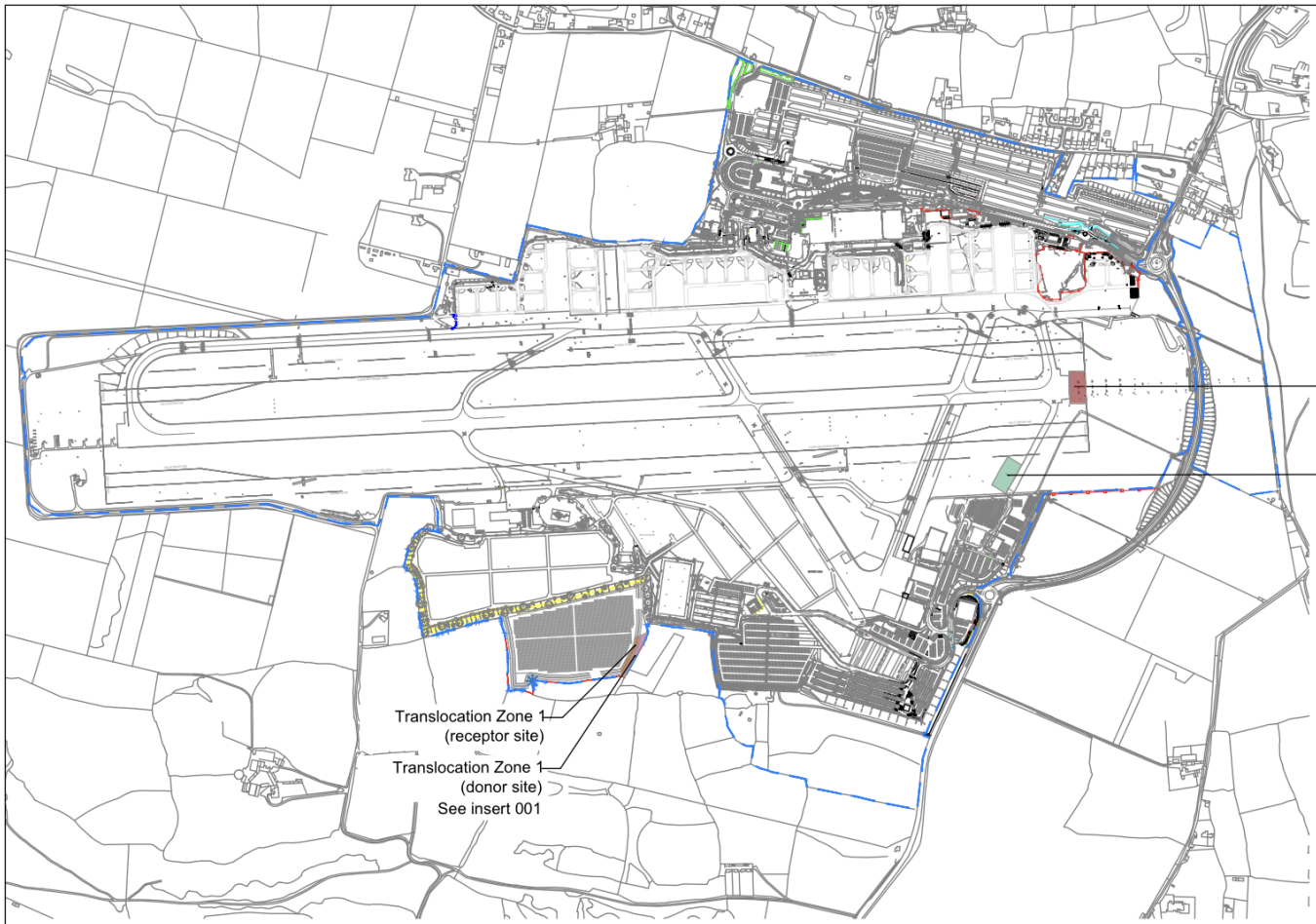
CLIENT Bristol Airport Limited

PROJECT Discharge of Planning Conditions 24 and 25

TITLE Phase 1 Habitat Map - Grasslands

SCALE @ A3	CREATED BY	CHECKED BY
1:3,000	CA	MJ
REFERENCE	**ISSUE/REVISION**	**DATE**
J01105-010		24/4/2023

APPENDIX B Grassland Translocation Areas



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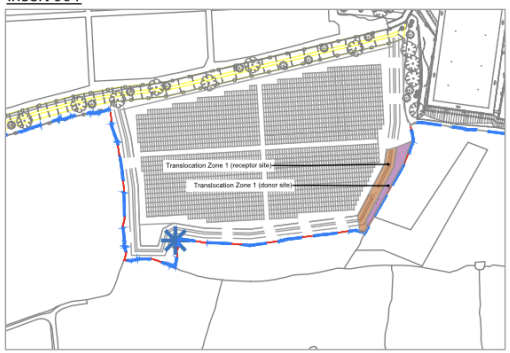

KEY

- Bristol airport boundary
- Translocation Zone 2 (donor site)
- Proposed Translocation Zone 2 (receptor site)
- Translocation Zone 1 (donor site)
- Proposed Translocation Zone 1 (receptor site)

rev	description	date	by	chk
A	PLANNING	06-10-2023	HC	MJ
-	DRAFT	21-04-2023	LS	MJ

A Amended for Planning

NORTH

Project:
BRISTOL AIRPORT 12MPPA CONDITION 24

Client:
BRISTOL AIRPORT

Drawing title:
Grassland Translocation, Mitigation, Enhancement and Management Areas

Status:
DRAFT

Drawing Number:	Scale:	Revision:
J01105-02	NTS	A

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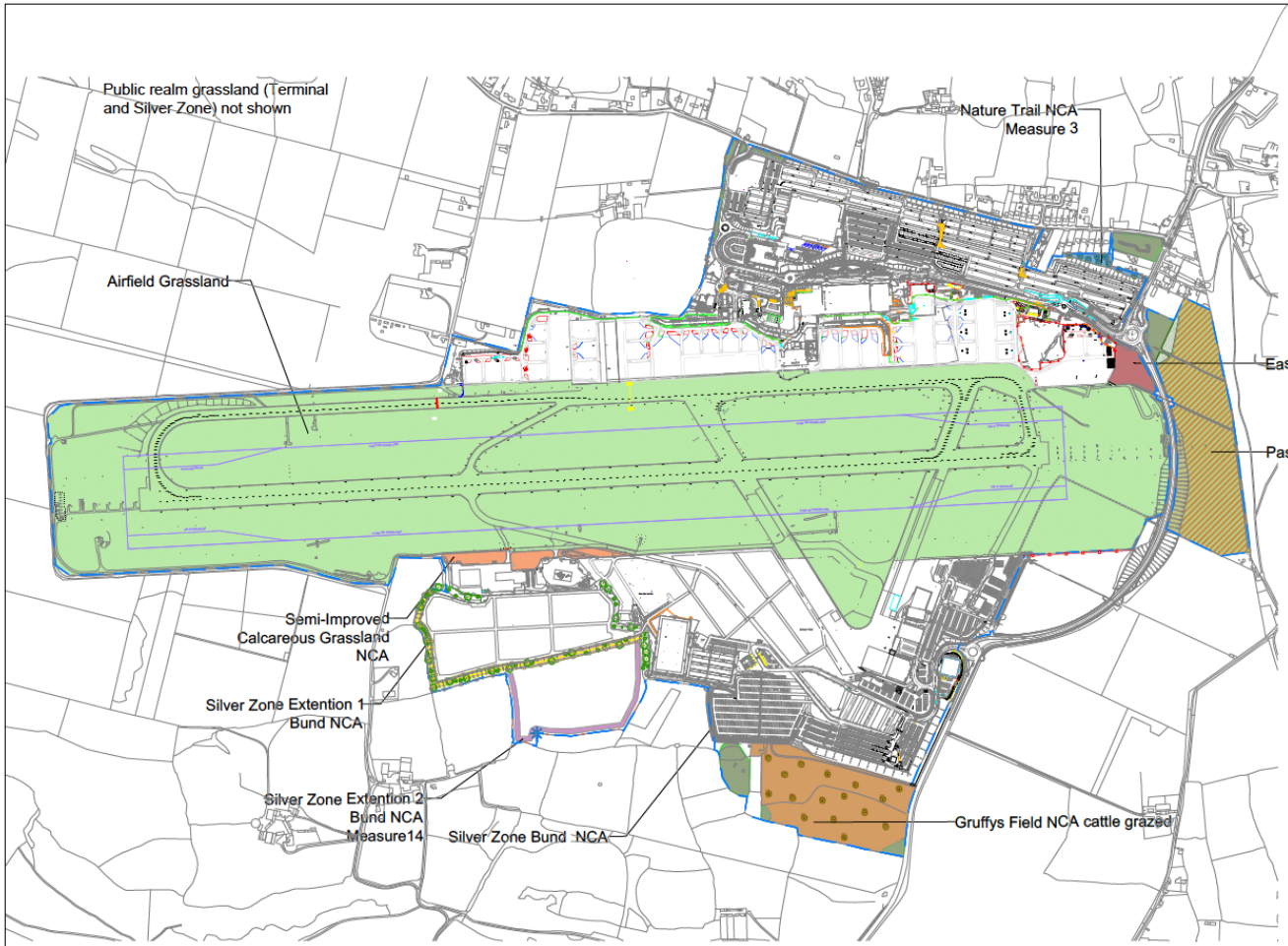
APPENDIX C Grassland Management Zones



KEY

- Bristol airport boundary
- Existing trees and vegetation
- Reinforcement of existing hedgerows
- New woodland / scrub planting
- New hedgerow / bund planting
- Parkland tree planting
- New / Restored pond
- Eastern standard grassland
  Semi-improved neutral grassland
- Pasture to east of A38 NCA
  Semi-improved grassland
- Nature trail NCA
  Semi-improved grassland
- Airfield grassland
  Predominantly semi-improved neutral grassland
- Guffy's Field NCA
  Improved grassland
- Bunds
  Enhancement species richness of existing grass sward using birdstrike mix

rev	description	date	by	chk
A	PLANNING	06-10-2023	HC	MJ
-	DRAFT	21-04-2023	LS	MJ

A Measure numbers added for reference

NORTH

Project:
BRISTOL AIRPORT 12MPPA CONDITION 24

Client:
BRISTOL AIRPORT

Drawing title:
Grassland Translocation, Mitigation, Enhancement and Management Areas

Status:
PLANNING

Drawing Number:	Scale:	Revision:
J01105	NTS	A

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APPENDIX D Grassland Habitat Condition Criteria

Condition Sheet: GRASSLAND Habitat Type (medium, high & very high distinctiveness)

UKHab Habitat Type(s)

Grassland - Lowland calcareous grassland
Grassland - Lowland dry acid grassland
Grassland - Lowland meadows
Grassland - Other lowland acid grassland
Grassland - Other neutral grassland
Grassland - Tall herb communities*
Grassland - Upland acid grassland
Grassland - Upland calcareous grassland
Grassland - Upland hay meadows
Sparsely vegetated land - Calaminarian grassland

Habitat Description

See UKHab

* Note Tall herb habitat that does not meet the definition of Annex 1 habitat 'Tall herb communities (H6430)' should be recorded as "Other neutral grassland"

Condition Assessment Criteria

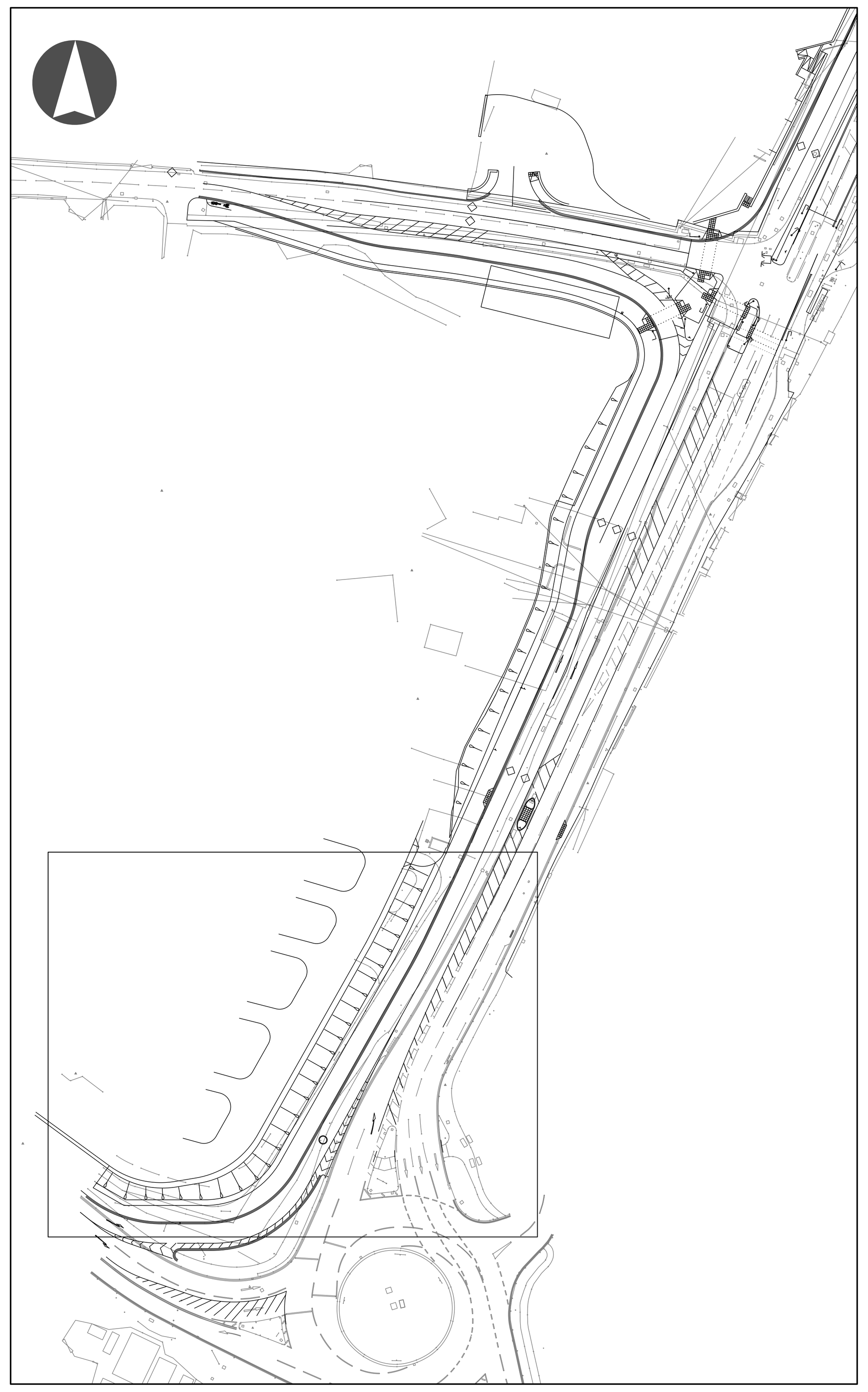
1	The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type (see UKHab definition). Wildflowers, sedges and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward.
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds and small mammals to live and breed.
3	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.
4	Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.
5	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of undesirable species[1] and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.

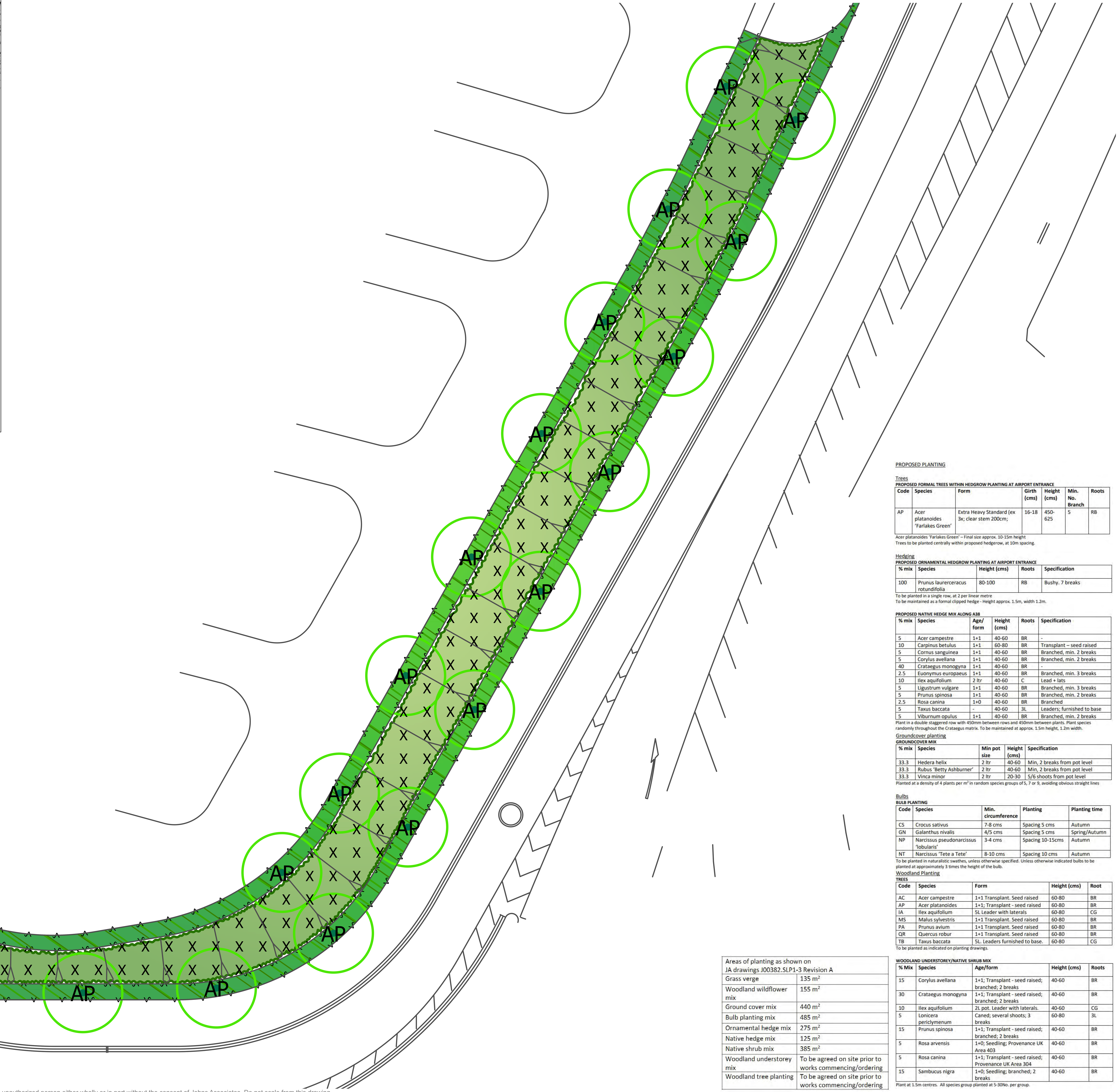
Condition Assessment Result	Condition Assessment Score
Passes 5 of 5 criteria	Good (3)
Passes 3 or 4 of 5 criteria	Moderate (2)
Passes 0, 1 or 2 of 5 criteria	Poor (1)

Notes

Footnote 1 - Species considered undesirable for this habitat type include: Creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare*, curled dock *Rumex crispus*, broad-leaved dock *Rumex obtusifolius*, common nettle *Urtica dioica*, creeping buttercup *Ranunculus repens*, greater plantain *Plantago major*, white clover *Trifolium repens*, cow parsley *Anthriscus sylvestris*.

APPENDIX K: A38 LANDSCAPE PLANS





JOHNS ASSOCIATES

CLIENT
Wood Environment and Infrastructure Solutions UK Limited

PROJECT
Bristol Airport 12mppa post submission support

TITLE
Soft Landscape Plan - Planting
Sheet 1 of 3 Revision A

SCALE @ A0	CREATED BY	CHECKED BY
1:100	JS	AP
REFERENCE	**REVISION**	**DATE ISSUED**
J00382.SLP1	A	20/3/2019

- Woodland - Exact location of woodland trees and understory mix to be agreed on site prior to works commencing.
- Trees
- Native Hedge
- Ornamental Hedge
- Native Shrub Mix
- Ground Cover Mix
- Bulb Planting
- Meadowmania AM14 for roadside verges or similar approved
- Emorsgate Mix EW1F wildflowers for woodland or similar approved

Revision A - 13/03/19
Base-map updated to most recent drawing (C1124-M2-A38-011 2.5) from CTAS, planting changed to reflect repositioning of fence line.

Areas of planting as shown on JA drawings J00382.SLP1-3 Revision A	
Grass verge	135 m^2
Woodland wildflower mix	155 m^2
Ground cover mix	440 m^2
Bulb planting mix	485 m^2
Ornamental hedge mix	275 m^2
Native hedge mix	125 m^2
Native shrub mix	385 m^2
Woodland understorey mix	To be agreed on site prior to works commencing/ordering
Woodland tree planting	To be agreed on site prior to works commencing/ordering

PROPOSED PLANTING

Trees

PROPOSED FORMAL TREES WITHIN HEDGROW PLANTING AT AIRPORT ENTRANCE

Code	Species	Form	Girth (cms)	Height (cms)	Min. No. Branch	Roots
AP	Acer platanoides 'Farlakes Green'	Extra Heavy Standard (ex 3x; clear stem 200cm;	16-18	450-625	5	RB

Acer platanoides 'Farlakes Green' – Final size approx. 10-15m height
Trees to be planted centrally within proposed hedgerow, at 10m spacing.

Hedging

PROPOSED ORNAMENTAL HEDGROW PLANTING AT AIRPORT ENTRANCE

% mix	Species	Height (cms)	Roots	Specification
100	Prunus laurerceracus rotundifolia	80-100	RB	Bushy. 7 breaks

To be planted in a single row, at 2 per linear metre
To be maintained as a formal clipped hedge - Height approx. 1.5m, width 1.2m.

PROPOSED NATIVE HEDGE MIX ALONG A38

% mix	Species	Age/ form	Height (cms)	Roots	Specification
5	Acer campestre	1+1	40-60	BR	-
10	Carpinus betulus	1+1	60-80	BR	Transplant – seed raised
5	Cornus sanguinea	1+1	40-60	BR	Branched, min. 2 breaks
5	Corylus avellana	1+1	40-60	BR	Branched, min. 2 breaks
40	Crataegus monogyna	1+1	40-60	BR	-
2.5	Euonymus europaeus	1+1	40-60	BR	Branched, min. 3 breaks
10	Ilex aquifolium	2 ltr	40-60	C	Lead + lats
5	Ligustrum vulgare	1+1	40-60	BR	Branched, min. 3 breaks
5	Prunus spinosa	1+1	40-60	BR	Branched, min. 2 breaks
2.5	Rosa canina	1+0	40-60	BR	Branched
5	Taxus baccata	-	40-60	3L	Leaders; furnished to base
5	Viburnum opulus	1+1	40-60	BR	Branched, min. 2 breaks

Plant in a double staggered row with 450mm between rows and 450mm between plants. Plant species randomly throughout the Crataegus matrix. To be maintained at approx. 1.5m height, 1.2m width.

Groundcover planting

GROUNDCOVER MIX

% mix	Species	Min pot size	Height (cms)	Specification
33.3	Hedera helix	2 ltr	40-60	Min, 2 breaks from pot level
33.3	Rubus 'Betty Ashburner'	2 ltr	40-60	Min, 2 breaks from pot level
33.3	Vinca minor	2 ltr	20-30	5/6 shoots from pot level

Planted at a density of 4 plants per m^2 in random species groups of 5, 7 or 9, avoiding obvious straight lines

Bulbs

BULB PLANTING

Code	Species	Min. circumference	Planting	Planting time
CS	Crocus sativus	7-8 cms	Spacing 5 cms	Autumn
GN	Galanthus nivalis	4/5 cms	Spacing 5 cms	Spring/Autumn
NP	Narcissus pseudonarcissus 'lobularis'	3-4 cms	Spacing 10-15cms	Autumn
NT	Narcissus 'Tete a Tete'	8-10 cms	Spacing 10 cms	Autumn

To be planted in naturalistic swathes, unless otherwise specified. Unless otherwise indicated bulbs to be planted at approximately 3 times the height of the bulb.

Woodland Planting

TREES

Code	Species	Form	Height (cms)	Root
AC	Acer campestre	1+1 Transplant. Seed raised	60-80	BR
AP	Acer platanoides	1+1; Transplant - seed raised	60-80	BR
IA	Ilex aquifolium	5L Leader with laterals	60-80	CG
MS	Malus sylvestris	1+1 Transplant. Seed raised	60-80	BR
PA	Prunus avium	1+1 Transplant. Seed raised	60-80	BR
QR	Quercus robur	1+1 Transplant. Seed raised	60-80	BR
TB	Taxus baccata	5L. Leaders furnished to base.	60-80	CG

To be planted as indicated on planting drawings.

WOODLAND UNDERSTOREY/NATIVE SHRUB MIX

% Mix	Species	Age/form	Height (cms)	Roots
15	Corylus avellana	1+1; Transplant - seed raised; branched; 2 breaks	40-60	BR
30	Crataegus monogyna	1+1; Transplant - seed raised; branched; 2 breaks	40-60	BR
10	Ilex aquifolium	2L pot. Leader with laterals.	40-60	CG
5	Lonicera periclymenum	Caned; several shoots; 3 breaks	60-80	3L
15	Prunus spinosa	1+1; Transplant - seed raised; branched; 2 breaks	40-60	BR
5	Rosa arvensis	1+0; Seedling; Provenance UK Area 403	40-60	BR
5	Rosa canina	1+1; Transplant - seed raised; Provenance UK Area 304	40-60	BR
15	Sambucus nigra	1+0; Seedling; branched; 2 breaks	40-60	BR

Plant at 1.5m centres. All species group planted at 5-30No. per group.

Soft Landscape Specification

General
It is the responsibility of the designer/developer to design foundations and structures to accommodate all proposed and existing trees and shrub planting, with reference made to NHBC Standards Chapter 4.2 *Building near Trees*, Revised 2018 where appropriate.
The developer/contractor should satisfy themselves that trees are a safe distance from drainage runs and services and that no planting falls within service strips.
All landscape contractors shall make themselves aware of all service locations prior to commencing on site works including planting operations.
All planting works to be carried out in accordance with BS4428 1989 'Code of Practice for General Landscape Operations (excluding hard surfaces)'.
Where any deviance from this specification occurs within a scheme, the contractor shall request the relevant detail from the designer prior to proceeding.

Existing Vegetation.
All trees and hedges which are shown for retention should be inspected for safety by a suitably qualified member of the Arboricultural Association and subject to BS5837 2012 – Trees in relation to design, demolition and construction - recommendations. They should be protected during all stages of construction with temporary fencing in accordance with BS5837 2012, and must comply with all applicable planning conditions. Any tree surgery required shall also be in accordance with BS3998 2010 'Tree work. Recomendations'.
The landscape contractor shall make the Landscape Architect aware of any injurious weeds (classified under the Weeds Act 1959) and invasive weeds (as noted in section 14(2) of the Wildlife and Countryside Act 1981, Schedule 9 Part II) that may be present on site at the earliest opportunity.

Topsoil.
The landscape contractor shall satisfy himself as to the suitability and availability of topsoil on site, and if necessary topsoil shall be imported from an approved site. Soil testing to be carried out as required by the Contract Administrator (CA). All topsoil to be in accordance with BS3882 2015 – Specification for topsoil and requirements for use. The depth of topsoil spread shall not normally exceed 300mm (maximum depth 400mm) with suitable loosened subsoil providing the remainder of the minimum rooting depth.
Minimum rooting depth shall normally be
Grass areas 150-400mm depth
Shrub areas 450-600mm depth,
Trees 900+mm depth.
Tree pits to be backfilled with topsoil – see tree planting specification.

Soil Ameliorants.
To be applied to all newly planted areas unless directed otherwise by the CA.
Alginure Seanure Soilbuilder or similar approved to be incorporated at approximately 70g/m2 to shrub beds worked into the top 50mm of soil, and 1.5kg per m2 of backfill for pit planting. All application rates to be applied as per manufactures recommendations/ instructions. Granular Slow Release Fertiliser (ie Scotts Enmag CRF 11.22.9+6Mg or similar approved) to be applied as per manufacturers instructions.

Plant Stock.
All plant material to be as specified in the Plant Schedule, and available for inspection by the Landscape Architect and/or CA.
All plant material shall be in accordance with BS3936-1 (1992) 'Nursery Stock Specification for Trees and Shrubs', BS3936-10 (1990) 'Nursery Stock Specification for Ground cover plants', BS3969:1998+A1:2013 'Recommendations for Turf for General Purposes', 'Handling and Establishing Landscape Plants', Horticultural Trades Association, 2002 and The National Plant Specification – Handling and establishment Nov 1995.
Any plant stock to be planted outside the planting season (November to March unless otherwise stated) to be containerized. All containerized stock to have healthy, well-developed root system within the specified pot size. Where growing on in the nursery is necessary all plant material is to be re-potted to the next approved pot size, re-spaced to allow for 15-20% growth per season, and maintained to healthy vigorous growth irrespective of weather conditions.

Planting Specification – proposed tree, shrub and hedge planting.

General
Planting of trees and shrubs to take place between end of October - March unless otherwise agreed.
All planting areas to be weed free prior to planting. Allow for application of approved translocated systemic herbicide in line with Health and Safety Regulations (HSE), Control Of Pesticide Regulations 1986 amended 1997, EU Biocides regulation 528/2012 (EU BPR) and Control of Substances Hazardous to Health (COSHH) 2002. Application to be as per manufacturers instructions.
All planting beds to be thoroughly forked over or rotovated to a depth of 400mm, prior to planting. Ensure that the subgrade and topsoil are both free draining. All planting beds to be 90mm below adjacent hard or grass surfaces. Where mown grass is proposed, soil levels to be 10mm below, of flush with adjacent surfaces.

Tree Planting
Trees to be planted into prepared tree pits, and backfilled with topsoil/soil ameliorants as above. Tree pits for container grown trees to be as below, unless otherwise directed:
6-10cm girth 900mm diameter x 750mm depth
10-18cm girth 1200mm diameter x 900mm depth
Semi-mature 1500mm diameter x 1050mm depth
Rootballed trees – pit diameter to be 500mm greater than the root-ball dimensions, wide enough to accommodate roots when fully spread. Depth of tree pit to be 150mm greater than the depth of the rootball/container and backfilled with 150mm layer of approved clean drainage gravel. Base and sides of all pits to be roughened to allow root penetration. Works to be in accordance with BS 4043:1989 Transplanting Root-balled Trees.
Where trees are planted within grassland they shall have a 400mm diameter circle around the base of the trunk to be maintained free from grass and spread with 75mm mulch.
All trees to be watered in when planted with a minimum of approx. 55litres/12 gallons, and then on a weekly basis for the duration of 12 months maintenance period, except when the weather conditions are very wet.
Tree Stakes: All trees (except for semi-mature trees) to be single staked – stakes well driven into the ground, minimum 300mm into bottom of tree pit. Stakes to be pressure treated, round (75mm diameter), peeled larch or similar. Trees to secured with plastic/rubber proprietary tree ties, nailed to the stake. For trees 14-16mm girth or larger, 2 no. 100mm diameter stakes required. All stakes to be pointed at one end, extending above ground by 1/3 of the height of the ground to the first branch.

Shrub/Hedge Planting
Shrubs to be planted in pits 150mm wider and deeper than their root spread. Pits to be backfilled with a mixture of topsoil/soil ameliorate as above.
Plants to be a minimum of 300mm from and adjacent hard surface.
All stock to be well watered when planted with approx. 20L of water per m2.
Following planting and watering operations, beds to be mulched with 75mm of approved mulch unless otherwise instructed.

Climbers
Climbers to be planted a minimum of 300mm from the base of a wall/structure, and trained back to support wires, along 2no. canes approx. 600mm long firmly lodged in the ground either side of the plant.
Planting requirements as per Shrub/Hedge planting.

Buffer Planting
All feathered trees and whips to be planted in prepared pits 600x600x600mm for feathered trees, and 300x300x300mm for whips. Pits to be backfilled with topsoil/soil ameliorants as above. All plants to be well firmed. Feathered trees to be single staked. All stock to be well watered when planted with a minimum of 4.5L/whip and 18L/feathered tree prior to applying 75mm depth bark mulch. All trees to be fitted with proprietary rabbit guards.

Grass Areas
Topsoil for grassed areas to be prepared to a fine tilth, all stones over 50mm removed and firmed to achieve a level surface. Grass seeding to comply with BS 4428:1989. Water all grass areas to maintain a healthy growth. Seeding to take place during period 1st March – 31st May, or 1st September – 31st October unless otherwise directed.

Turf Areas.
Preparation for turfed areas as for areas of seeded grassland. Turf to conform to BS 3969:1998+A1:2013 from an approved source. Turf to be a high quality, purpose grown turf.

Establishment cut to all grass areas.
When grass is 50mm high remove any debris, litter and stones and cut grass to between 25-30mm. remove all arisings.

Maintenance
Regular visits shall be made for twelve months following practical completion, to maintain all planted areas in a weed and litter free condition. Minimum number of visits to be
Tree and Shrub areas min 8 visits per year
Amenity/species rich grassland min 16 visits per year
Conservation/wildflower meadow min 2 visits per year (early spring and after seed drop).
Maintenance visits to include watering, pruning, pest/disease control, litter removal, checking of tree stakes and ties and re-mulching as required.
All planting beds to be maintained with a mulch layer of medium grade pulverized bark (0-30mm particle size) to a depth of 75mm. All mulch to be pest, disease and weed free and shall not have been treated with any additives. Mulch to be spread carefully so as not to cover shoots and foliage and to finish 15mm below adjacent surfaces.
Amenity grassland to be cut to achieve a neat and tidy appearance, with a mowing height of 25mm.
All arisings to be removed from site. Mowing to be suspended if drought or very wet conditions occur.

PLANTING UNDER EXISTING TREES
All Arboricultural works to follow good horticultural practice and comply with BS3998 2010 'Tree work. Recommendations'.
Plant under deciduous trees to take place during autumn, whenever possible. This will allow new under-storey planting chance to establish before tree leaf break in spring.
Where proposed planting is to take place within the Root Protection Zone of existing trees, care must be taken to avoid/minimise disturbance to tree roots.
No machinery to be used in the vicinity of the Root Protection Zone. Any excavations to be by hand digging only.
No spoil/ building materials etc to be stored within the Root Protection Zone.
Where turf or weeds are present beneath the existing trees, remove by hand digging. Care must be taken not to dig too deeply. Remove excess soil etc from weeds/turf and return this to planting area.
Where there is substantial weed/turf to be removed apply systemic, non-selective herbicide only – Glyphosate or similar approved. To be applied as per manufacturers instructions. Care to be taken that the weedkiller/spray does not come into contact with the leaf area of existing trees/shrubs etc.
Roots and tree trunks are unaffected by such trans-located herbicides. When turf/weeds have died, removed by careful hand digging.
Where planting is to be carried out over more than a day, water well and temporarily mulch or line with polyethylene sheet, any soil areas that are newly cultivated. This will reduce evaporation and keep any exposed roots from drying out.
To excavate planting pits, hand dig pit large enough to accommodate the roots of the proposed under-storey planting. Where possible locate planting pits to avoid any large root (5cms +) encountered. When hand digging retain as many existing roots as possible.
No roots of 2.5cms in diameter or greater to be cut unless the councils tree officer/supervising officer has agreed beforehand. Where necessary, small tree roots may be cut through to allow planting pits to be located as limited pruning of smaller roots will not adversely affect the tree. Where roots are to be pruned, use sharp tools (secateurs or handsaw) to make clean cut. Leave as small a wound as possible. Add a sprinkling of granular slow release fertiliser ie Scotts Enmag CRF N:P:K 11.22.9+6Mg / organic compost PAS 100 or similar approved, prior to planting. Application as per manufacturers' instruction.
When planting beneath existing trees, initial work should be carried out in sections near to the tree, working away to the perimeter of the planting bed. Lightly water sections when completed.
Apply organic mulch to cultivated ground (10 -15 cm in depth) taking care to keep mulch away from tree trunks. Renew mulch each spring where tree roots are shallow and dense. Water thoroughly when planting is complete, and continue suitable watering regime to ensure the continued thriving of all plants.

Base-mapping taken from Drawing C1124-M2-A38-011 2.5 from C-TAS.