



Appendix 15.11 Habitat and Species Management Plan



Habitats and Species Management Plan

Coolglass Windfarm Vol 2

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1.0 Introduction

This report has been prepared by SLR Consulting Limited (SLR) on behalf of Coolglass Wind Farm Limited (the 'Applicant'), located in Co. Laois. The report presents a Habitat and Species Ecological Management Plan (HSMP) for Coolglass wind farm (the 'Proposed Development') for an initial 20-year period. The HSMP forms a commitment from the development proposal and should be read in conjunction with Environmental Impact Assessment Report (EIAR) chapter 15 (biodiversity) and associated Natura Impact Statement (NIS) report. Any mitigation or compensation measures set out in this document do not relate to any mitigation measures set out in the NIS. All measures in the HSMP will be implemented in full.

1.1 Scope

This HSMP sets out the key objectives and methods by which parts of the Proposed Development lands (the 'Site') will be managed to the benefit of biodiversity. The HSMP is intended to cover the establishment and management of habitats and species required to compensate for impacts identified within the EIAR. Measures to mitigate impacts such as the spread of invasive and non-native species are also included, along with enhancement measures such as the provision of additional nesting habitat for birds and hibernacula for amphibians and reptiles.

Further information about mitigation measures to be employed during the construction period is included in the Construction Environmental Management Plan (CEMP).

2.0 Habitats

The following sections sets out measures to establish, monitor and maintain hedgerows, treelines and broad-leaved woodland that will be implemented in full.

2.1 Hedgerow and treeline creation/enhancement

2.1.1 Objectives 1.0, 2.0 and 3.0

The objectives relating to hedgerow/treeline creation/enhancement are set out below along with associated measures to successfully establish and manage these habitats. Objectives and criteria for success have been developed in accordance with the Green, Low-Carbon, Agri-Environment Scheme (GLAS) specifications (Department of Agriculture, Food and the Marine, 2020) and the Hedgerow Appraisal System (Foulkes et al., 2013).

Figure 1 shows the locations for proposed hedgerow and treeline creation, which are all within the red-line boundary.

Objective 1.0 Establishment of new hedgerows/treelines

- Plant 939 m of new hedgerows and 141 m of new treelines using native fruit and seed-bearing species (e.g. hawthorn ***Crataegus monogyna***, blackthorn ***Prunus spinosa***, dog rose ***Rosa canina***, guelder rose ***Viburnum opulus***, hazel ***Corylus avellana***, holly ***Ilex aquifolium***, spindle ***Euonymus europaeus*** and alder buckthorn ***Frangula alnus*** for hedgerows and bird cherry ***Prunus padus***, crab apple ***Malus sylvestris***, goat willow ***Salix caprea***, grey willow ***Salix cinerea***, rowan ***Sorbus aucuparia***, wild cherry ***Prunus avium***, hawthorn, Irish whitebeam ***Sorbus hibernica***, sessile oak ***Quercus petraea*** and pedunculate oak ***Quercus robur*** for treelines) using a 'like-for-like' approach to replace lost hedgerows/treelines where possible.
- If planting a new hedgerow that will be topped, the species chosen must tolerate trimming, such as hawthorn and blackthorn.
- Plants must be of Irish Origin or Irish Provenance and purchased from Department of Agriculture, Fishing and the Marine (DAFM) registered professional operators¹.
- New planting will be undertaken in the appropriate season, with bareroot stock planted October to December (avoiding periods when the ground is waterlogged or frozen) unless on clay, when planting should be delayed until March due to risk of heave during heavy frost.
- Planting will not be undertaken until the first appropriate season post-construction to avoid damage to whips.
- Cultivate the ground prior to planting and add organic matter if required.
- To ensure new hedgerows are beneficial for biodiversity, there must be six plants per metre in a double-staggered row with >10 species per 30 m section. Overall, no one species will make up more than 70% of the total number of plants.
- If planting a new treeline, any mix of native hedgerow and tree species can be chosen, with one tree at every 15 m.
- Water during first year to assist with establishment. Frequency of watering to adapt to weather conditions.
- If planting new hedgerows in a grass or tillage field, they must be protected from livestock with an appropriate permanent fence, which can be moved out further as the hedgerow matures and expands.
- Trees will be left to mature without cutting and protected with a tree guard/shelter and fenced off from livestock if present.
- Cut hedgerows annually during establishment phase to encourage sideways growth and canopy closure. Some plants will not be cut / trimmed and allowed to grow into mature hedgerow trees.

¹ The GLAS specification provides the mailbox plantandpests@agriculture.gov.ie as the place to request this info from.

- Competing vegetation will be controlled, preferably via mulching with organic matter, and avoiding the use of chemical herbicides.
- Failed or dead plants (identified during condition assessments) should be replaced the following planting season.
- Should any newly planted hedgerows require temporary removal to allow for maintenance works to the wind farm, they will be reinstated following the criteria mentioned above.

Objective 2.0 Enhancing existing poor-quality hedgerows/treelines

- Ensure all hedgerows/treelines within the red-line boundary are fenced to prevent (further) damage from livestock in areas where livestock are / could be present.
- Remove competing vegetation or alien invasive plant species following relevant guidance including that published online by the Department for Agriculture, Food and the Marine (DAFM, 2021) and the National Roads Authority (2010).
- Fill in gaps in poor-quality hedgerows/treelines following the relevant species and planting requirements set out for Objective 1.0.

Objective 3.0 Enhancing habitat linkages and continuity of habitats

- The locations of any new hedgerows/treelines to be planted as part of objective 1.0 will be chosen to maximise connectivity between woodland habitats within and outside of the red-line boundary (see Figure 1).

2.1.2 Measures of success

Success will be assessed by monitoring the condition of hedgerows/treelines throughout the establishment phase, and, at less frequent intervals, throughout the maintenance phases.

Hedgerows

- Newly created or enhanced hedgerows will be subject to condition assessment following the Hedgerow Appraisal System each year after planting for the first 5 years (the establishment phase), and then every 5 years until (and including) year 20 (the maintenance phase). This will help identify ongoing management actions, such as weed control, gapping up and where fence maintenance is required.
- By Year 5 after planting, hedgerows should meet the criteria for 'Favourable' under the Hedgerow Appraisal System.
- In addition to the condition assessment, the diversity of the tree / shrub / climber component (otherwise described in the Hedgerow Appraisal System as 'canopy' forming species) should be the same, or greater than, that at planting (>10 native species per 30 m length).

Treelines

- Newly planted trees forming treelines will be inspected each year after planting for the first 5 years, and then every 5 years until year 20. These inspections will inform the need or otherwise for weed control, replacement of failed trees, removal of tree guards (usually around Yr 3-5), and pruning.
- Success will be defined as >95% of trees established at Year 5, with at least 90% at Year 20 meeting the British Standard 5837: Trees in relation to design, demolition and construction – Recommendations (2012) criteria for Category A - Tree of High Quality'.

3.0 Species

The following sections set out measures to create habitats or otherwise enhance the Site for birds, mammals, amphibians and reptiles. These measures are independent of any compensation measures which may be required by wildlife licences potentially needed to allow construction work to progress.

3.1 Bats

3.1.1 Objective 4.0

Any works to roosts recorded during pre-construction checks of trees / bridges will be subject to NWPS licence conditions.

All hedgerows and treelines that will be lost due to construction will be replaced (as per Section 2.1) which will ensure there is no net loss of commuting routes for bats and the creation of mixed broadleaved woodland (as per Section 2.2) will provide foraging resources to bats in the medium and long-term.

3.2 Birds

3.2.1 Objective 5.0 and 6.0

The adoption of good practice measures will avoid damage/destruction of bird nests and disturbance / displacement of birds during construction (see Section 15.6.1 in EIAR chapter 15 for more details) would ensure no impacts to habitats used by birds in the wider area. However, to reduce or offset collision risk during operation, measures to dissuade sensitive species from nesting near to turbines will be implemented. Also, measures to reinforce local populations through provision of additional nesting habitat will be implemented. Enhancement measures further include provision of nesting/breeding habitat as set out below, and Objectives 1.0-3.0 (relating to creation of hedgerows and treelines) will also be of benefit to the local bird populations.

Figure 1 shows the indicative locations for proposed bird management measures.

Objective 5.0 Reduction in habitat suitability

The EIAR states that:

Mitigation to limit common kestrel foraging activity around turbines will be implemented. This will include the following measures to reduce prey availability in an area of 96 m to 103 m surrounding each turbine (this reflects the dimensions of the turbine permutations assessed):

- **Creation of uniformly short vegetation heights via infrequent mowing or trimming of vegetation;**
- **Removal of timber/brush from felling and chipping of tree stumps to ground level;**
- **Spread and compaction of chipped wood and spoil to create a flat surface to prevent rapid colonisation of new vegetation; and**
- **Piping/filling over of open field/forestry drains.**

Objective 6.0 Provision of bird nesting habitat

Additional measures to increase nesting habitat will be implemented as follows:

- Erection of one swift tower whose location will be agreed in conjunction with landowners and Planning Authority prior to the operation of the Proposed Development. An indicative location within the red-line boundary is shown in Figure 1.

3.2.2 Measures of Success

- Annual vegetation checks in Years 1-5 around turbines indicate that these areas are being maintained as unsuitable for common kestrel.
- Use of swift tower by relevant bird species as evidenced by annual breeding bird surveys / checks of nesting habitat (using methods that avoid disturbance).
- Bird surveys / checks every year during years 1-5 post-construction.

3.3 Hedgehogs

3.3.1 Objective 7.0

The adoption of good practice measures during construction will minimise direct and indirect impacts on hedgehogs *Erinaceus europaeus*. Measures to enhance the Site for hedgehog during operation involve the creation of hibernacula and are set out below. Objectives have been developed using Gazzard and Baker (2022).

Figure 1 shows the indicative locations for proposed hedgehog management measures within the red-line boundary.

Objective 7.0 Provision of hibernacula for hedgehogs

- Eight no. hibernacula will be constructed for hedgehogs from logs arising from felled trees as shown in Figure 1;
- The hibernacula will be constructed in areas that are south facing, well-drained, undisturbed by humans/vehicles (e.g. paths and roads) adjacent to broad-leaved trees (to provide leaves for nest construction²) and act as transitions between habitats (e.g. between scrub and woodland etc);
- The logs will be laid in a hole 0.5 m deep, and at least 2 m wide and 4 m long, with turves of vegetation from the area excavated kept aside to be placed on top of the hibernacula. The hole will be filled to just below ground level with gravel or sand to facilitate drainage, with logs piled on top in a configuration that creates voids within the heap, with access gaps into these voids. Logs will be piled to a height of at least 1m. Soil arising from the hole and the salvaged turves of vegetation will be laid on top of the logs with the aim of establishing a cover of vegetation to provide insulation.
- The locations of the hibernacula will be agreed in conjunction with landowners and the Planning Authority prior to the operation of the Proposed Development.

3.3.2 Measures of success

- Annual checks in Years 1-5 indicate hibernacula are in suitable condition for use by hedgehogs.
- Evidence of use (droppings, nests) recorded within at least two hibernacula in the first 5 year after construction.
- All hedgehog records to be submitted to the Irish Hedgehog Survey online at [Record sightings | Hedgehog Survey \(irishhedgehogsurvey.com\)](https://www.record-sightings-hedgehog-survey.com/)

3.4 Reptiles and amphibians

3.4.1 Objectives 8.0 and 9.0

Best practice measures adopted during construction will prevent direct impacts to frogs and reptiles such as pre-works checks for spawning frogs and the use of herpetofauna fencing to prevent individuals from accessing potentially dangerous construction areas.

To increase the suitability of the site for reptiles and amphibians further enhancement measures are presented below based on guidance within the Reptile Habitat Management Handbook (Edgar et al., 2010) and the Amphibian Habitat Management Handbook (Baker et al, 2011).

Figure 1 shows the indicative locations for proposed reptile and amphibian management measures within the red-line boundary.

²Gazzard & Baker, 2022 found that the presence of supply of broad leaved leaves as a bedding material increased the likelihood of nest box occupancy.

Objective 8.0 Provision of reptile and amphibian hibernacula

- Eight no. hibernacula will be constructed for reptiles and amphibians from logs formed from felled trees (see Figure 1);
- The hibernacula will be created in addition to those for hedgehogs, but to the same specification.
- The hibernacula will be located in a sunny position, orientated such that a long side faces south and near to watercourses / drainage ditches, within rough grassland or scrub and avoiding areas of intensively managed / grazed land.

Objective 9.0 Management of new and existing drainage ditches to benefit amphibians

- Dredging to be undertaken of new and existing ditches within red-line boundary outside amphibian breeding period (February – July) and on rotation with not more than ¼ of ditch length dredged over a 3-year period.
- Dredging arisings to be left near to ditch.
- Ditch / marginal vegetation to be cut on rotation, with not more than ¼ of ditch length cut over a 3-year period, and to a minimum of 150 mm above ground level.
- Shading vegetation controlled to ensure ditch network does not become totally shaded. Not more than ¼ of shading vegetation cut over a 3-year period.
- Where possible in discrete sections ditches to be locally widened and deepened to encourage 'ponding' / retention of water during dry spells.

3.4.2 Measures of success

Reptile and amphibian species richness and abundance will be measured via physical checks to ensure hibernacula are still present and functional in years 1-5 post-construction, plus the ditch network will be checked against measures outlined in objective 9.0 .

3.5 Invertebrates

3.5.1 Objective 10.0

To increase the suitability of the site for pollinators. further enhancement measures are presented below based on guidance contained within the NBDC (2022) Protecting Farmland Pollinators Project report was used to inform proposed management measures for invertebrates.

Figure 1 shows the indicative locations for proposed invertebrate management measures.

Objective 10.0 Provision of invertebrate hibernacula

- Maintain 5 m rough grassland buffer along borrow pit to provide habitat for pollinators;
- Erect insect hotels in the first year of operation. Insect hotels or bee boxes can be created by drilling holes into fence posts or pieces of wood and positioning appropriately. These sites can be created along dry hedgerows, driveways and other field boundaries;
- Ensure insect hotels are maintained or replaced over the lifespan of the wind farm as required; and
- Locate both insect hotels in sunny, sheltered areas, ideally no more than 300 m from areas of food plants.

3.5.2 Measures of success

- At least three insect hotels per 35 ha;

- Maintenance checks to ensure grassland buffer habitats, and insect hotels still present and functional, to be carried out annually in Years 1-5 post-construction.

4.0 Invasive Species

Regarding plants, cherry laurel ***Prunus laurocerasus***, fuchsia ***Fuchsia magellanica***, Himalayan honeysuckle ***Leycesteria formosa***, Japanese knotweed ***Fallopia japonica***, Japanese rose ***Rosa rugosa***, red flowering currant ***Ribes sanguineum*** and snowberry ***Symphocarpos alba*** and have been recorded near to the Proposed Development by surveys. Canadian pondweed ***Elodea canadensis*** was also recorded by aquatic surveys.

Regarding animals, crayfish plague ***Aphanomyces astaci*** was recorded by aquatic surveys and greater white-toothed ***Crocidura russula*** shrew was recorded by terrestrial surveys. However, measures to minimise the risk of spreading crayfish plague are described in the EIAR chapter and the Proposed Development will not spread greater white-toothed shrew. Consequently, the below focuses on invasive alien plant species.

The distribution of the invasive alien plant species is presented in the EIAR Figure 15-4.

Table 4-1 below describes the location of the species in relation to the Proposed Development’s footprint.

Table 4-1: IAS species recorded

Species	X (ITM)	Y (ITM)	Description of Baseline Conditions	Within Development Footprint? Y/N
Canadian pondweed	657171	696342	At aquatic survey site A15 (Stradbally River) downstream of grid connection route (GCR) option 2	N
	656510	679059	At aquatic survey site C7 (Clogh River) downstream of southern cluster	N
Cherry laurel	656558	684477	In forestry southern cluster	N
	656512	685618	Next to forestry track southern cluster	N
	656547	685164	In hedgerow southern cluster	Y
	651361	683683	In hedgerow along GCR option 1	Y
	650981	683665	In hedgerow along GCR option 1	Y
Fuchsia	656548	685171	In hedgerow southern cluster	Y
	657181	686671	In quarry borrow pit	Y
Himalayan honeysuckle	650765	683629	In hedgerow along GCR option 1	Y
Japanese knotweed	657170	686671	In quarry borrow pit	Y
	657178	686674	In quarry borrow pit	Y
	657178	686667	In quarry borrow pit	Y
	652375	683682	Near house along GCR option 2	N

Species	X (ITM)	Y (ITM)	Description of Baseline Conditions	Within Development Footprint? Y/N
Japanese rose	656552	685166	In hedgerow southern cluster	Y
Red flowering currant	651243	683673	In hedgerow along GCR option 1	Y
Snowberry	656548	685154	In hedgerow southern cluster	Y
	656553	685147	In hedgerow southern cluster	Y
	653612	690398	In hedgerow along GCR option 2	Y
	653418	685726	In hedgerow along GCR option 1	Y
	653424	685726	In hedgerow along GCR option 1	Y
	651283	683683	In hedgerow along GCR option 1	Y
	651034	683666	In hedgerow along GCR option 1	Y

4.1 Objective 11.0 Control of Invasive Alien Species

To eradicate and/or halt the spread of IAS via prevention, containment, treatment and eradication, the following management measures will be implemented with reference to best-practice guidance provided in relevant sections.

4.2 Details of proposed management measures

4.2.1 General prevention measures

- Supervision of control measures and treatment by appropriate qualified ecologist or invasive species specialist;
- Use of toolbox talks given by suitably qualified personnel as part of site introduction to workers, including what to look out for and procedures to follow if invasive species are observed;
- Only planning or sowing native species within the main wind farm site, and along the GCR and TDR.
- Where invasive species are physically removed, disturbed soil will be seeded or replanted with native plant species to prevent recolonisation of bare soil by non-natives;
- Unwanted material originating from the Site will be transported off-site by an appropriate licenced waste contractor and disposed of at a suitably licenced facility, or buried on-site following NRA (2010) guidelines;
- Signs will be used to warn workers of invasive species contamination;
- Good hygiene practices;
- Removal of build-up of soil on equipment;
- Keeping equipment clean;
- Washing vehicles existing the Site using a pressure washer to prevent the transport of seeds;
- Storing wastewater from washing facilities securely and treating to prevent spread of invasive species outside the Site; and
- Checking footwear and clothing of operatives working nearby invasive species for seeds, fruits or other viable material before leaving Site.

4.2.2 General containment measures

- A pre-construction survey will be used to confirm the findings of the EIAR during the growing season immediately prior to the construction phase. This will be used to physically mark out the extent of invasive plant species.
- A 1 m buffer (except for named species below) will be used to cordon off invasive species outside the works footprint.

4.2.3 Species-specific treatment measures

Japanese knotweed

Japanese knotweed code of practice

To help developers, consultants, and contractors to select the most appropriate treatment option, some excerpts from the Knotweed Code of Practice³ are reproduced below. The code of practice has been developed by experts in the control of Japanese knotweed and is based on the successes and failures of a number of Japanese knotweed management plans in the United Kingdom. Therefore, it represents the best available guidance on the different treatment options.

- ***“Unless an area of Japanese knotweed is likely to have a direct impact on the development, control it in its original location with herbicide over a suitable period of time, usually two to five years.***
- ***Only consider excavating Japanese knotweed as a last resort, and if so, keep the amount of knotweed excavated to a minimum.***
- ***Soil containing Japanese knotweed material may be buried on the site where it is produced to ensure that you completely kill it. Bury material at least 5m deep.***
- ***Where local conditions mean you cannot use burial as an option, it may be possible to create a Japanese knotweed bund. The purpose of the bund is to move the Japanese knotweed to an area of the site that is not used. This ‘buys time’ for treatment that would not be possible where the Japanese knotweed was originally located.***
- ***Due to timing, location, landfill is the only reliable option, but it should be treated as a last resort. Landfill can be expensive and would require haulage, which would increase the risk of Japanese knotweed spreading.***
- ***When transporting soil infested with Japanese knotweed to landfill, it is essential to carry out strict hygiene measures. If these standards are not followed, this may result in the spread of this invasive species. Japanese knotweed is a particular problem along transport routes/corridors, where it can interfere with the line of vision and can potentially result in traffic accidents.”***

Information is also provided in the National Road Authority (NRA) (now Transport Infrastructure Ireland (TII))⁴, and Invasive Species Ireland (ISI)⁵ in relation to identification, control and eradication of Japanese knotweed.

Exclusion zone

Prior to the construction phase/excavations at the Site, the following bio-security measures will be in place at the site;

- A 7m exclusion zone, measured horizontally from the nearest visible Japanese knotweed plant, will be established around all areas infested by Japanese knotweed.

³ UK Environment Agency (2013) The Knotweed Code of Practice: Managing Japanese Knotweed on development sites. Version 3. Published by the UK Environment Agency, Bristol. Available online at <https://www.gov.uk/government/publications/japanese-knotweed-managing-on-development-sites> (now withdrawn).

⁴<https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf>

⁵ [Invasive Species Northern Ireland – Invasive Species Northern Ireland \(invasivespeciesni.co.uk\)](http://invasivespeciesni.co.uk)

- Where part of the exclusion zone encroaches onto an active public access, or beyond a site boundary, this section of the exclusion zone will be positioned as close as possible to the boundary.
- The exclusion zone will be delineated with a secure temporary construction fence, such as herras panels or timber post and netting, and be fitted with appropriate warning / advisory signage.
- Fencing will remain in place for the duration of construction works, and while the stand is being treated, allowing the rest of the fencing to be constructed. No fencing will be erected within this exclusion until treatment is completed and no new growth is detected.
- Signs will be placed on the fence to advise site personnel that the area contains Japanese knotweed material, and that bio-security measures are actively in force.

Chemical control

The desired option to treat Japanese knotweed generally is to control the infestation in-situ with a combination of physical and herbicide control over a period of time (typically 3-5 years, or until no new growth is observed). The control of Japanese Knotweed will require the use of herbicides, which can pose a risk to human health, to non-target plants or to wildlife. In order to ensure the safety of herbicide applicators and of other public users of the site, it is essential that a competent and qualified person carries out the herbicide treatment. A qualified and experienced contractor will be employed to carry out all treatment work. The contractor will follow the detailed recommendations of the following documents for the control of invasive species and noxious weeds:

- Chapter 7 and Appendix 3 of the TII Publication: The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (NRA, 2010)
- Best Practice Management Guidelines for Japanese Knotweed (Invasive Species Ireland, 2015)
- Circular Letter NPWS 2/08 Use of Herbicide Spray on Vegetated Road Verges (National Parks and Wildlife Service 2008)

A systemic herbicide (e.g. Picloram) and/or a bioactive formulation (i.e. glyphosate) may be sprayed on foliage during dry weather or injected directly into the stems of Japanese Knotweed plants identified within the proposed development site. Strong systemic herbicides are most effective at targeting the persistent roots of Japanese Knotweed, however it should be noted that they may also persist in the soil and/or kill surrounding vegetation. The length of treatment may vary depending on the type of herbicide used, i.e. highly persistent herbicides may eradicate a plant within one to two years, whereas non-persistent herbicides (such as glyphosate) may take over a period of at least three years to ensure the successful eradication of the plants.

Annual spot-checks will be conducted in May-June to identify and retreat any re-growth. Such a treatment can take up to five years to completely eradicate growth; therefore, further treatment may be required beyond the three years. This will be determined by the results of the monitoring. Japanese Knotweed does not produce viable seed in Ireland, and therefore seed germination in subsequent years will not be an issue. The optimal time period for treatment is May-June and September-October.

It should be noted that these herbicides can pose a general risk to non-target plants, to wildlife and/or human health. Chemical control using a bioactive formulation of glyphosate is the most appropriate herbicide for use in or near water (Environment Agency, 2010). To ensure the safety of herbicide applicators and of other public users of the site, a qualified and experienced contractor should be employed to carry out all work.

Cherry laurel

Four options for the treatment of cherry laurel have been proposed. Any one or a combination of these four options shall be used to eradicate cherry laurel from the site and avoid the spread of the species. However, the following general recommendations will be adhered to as part of the plan:

- No treatment measures to take place in these areas without supervision and agreement by appointed Cherry Laurel eradication specialist.
- The cherry laurel plant contains cyanide and as per good practice will only be handled with gloves. This plant will be disposed of via an appropriately licensed waste facility.
- Equipment, clothing and footwear is to be checked following treatment operations and cleared of fruits/seeds as necessary.

Option 1 – Cut to stump and dig out stump; bury onsite This method involves cutting the main stem of the plant down near ground level and digging out the stump and any visible roots. This option is not usually practical in areas where there are other invasive plants present as the disturbed soil can allow for the setting of seeds or the spread of rhizomes of adjacent species (ISI, 2008).

Option 2 – Cut to stump and treat stump with herbicide This method involves cutting the main stem of the plant down near ground level, and applying herbicide to the freshly cut wound. The herbicide concentrations used, and timings of applications vary according to which chemical is used. When treating many stems, vegetable dye added to herbicide is useful for highlighting the stems that have and haven't been treated. The use of a brush or other such applicator will provide an accurate application and prevent damaging adjacent non-target plants via spray drift. Please see table below for best treatment time (ISI, 2008). Since the 26th November 2015, only a DAFM-registered professional user can apply Plant Protection Products that are authorised for professional use. As such any application of herbicide must be carried out by a professional user. Since the 26th November 2016, it has been a requirement for sprayers to have passed a Pesticide Application Equipment Test before being used to apply professional use Plant Protection Products.

Option 3 – Cut to main stem and inject stem with herbicide This method involves the 'drill and drop' method where the main stem is cut, and a hole drilled into the cut. The main drawback to this technique is that the plant is left in place to rot, which can take a decade or more. Please see Table 5-1 below for best treatment time (ISI, 2008).

Option 4 - Cut back to stump and spray regrowth with herbicide This application involves cutting a main stem down near ground level and then treating the new stems with herbicide. This method is the least effective as some stems may be missed and not treated. Also, the application of herbicide is generally via spraying, which can result in adjacent non-target plants being killed off. Please see Table 5-1 below for the best treatment times (ISI, 2008)

Any reproductive plant material will be carefully disposed of following NRA (2010) Guidelines. Any equipment used will be inspected and thoroughly cleaned, as will the footwear and clothing of operatives removing invasive species material. Any material arising from cleaning of equipment and footwear will be disposed of in a manner which will not cause the spread of invasive species

Snowberry

The primary means of preventing spread of this species due to the works is predicted to be avoidance, as it is located in hedgerows along the two GCR options. In the event of interaction of works with snowberry, one option for the treatment of snowberry at the site has been proposed to avoid the spread of the species. The following general recommendations will be adhered to as part of the plan:

- Snowberry is spread both by seed, a buffer area of 1m will be left to prevent further contact with plants, possibly causing seeds to fall or become attached to machinery or people. Disturbed seeds may result in the propagation of a new snowberry population elsewhere.
- Staff shall be made aware of this buffer zone when working within areas of infestation.
- Areas of infestation will be fenced off from other works areas including a buffering distance of up to 1m to create exclusion zones.
- Construction works will not be allowed within exclusion zones until the species has been fully removed but may continue outside of these areas.
- No treatment measures to take place in these areas without supervision and agreement by appointed eradication specialist.
- All machinery and vehicles operating within areas of infestation to be thoroughly checked and if necessary cleaned prior to leaving the area to protect against further spreading of snowberry.
- No material shall be taken from areas of infestation, unless for disposal. All material will be either deep buried (2m) or transported by an appropriately licensed waste contractor and received by an appropriately licensed facility.
- All staff shall be made aware of nature of threat via toolbox talks as part of site inductions. Toolbox talks shall be undertaken with all personnel accessing the site to ensure that the details of the invasive species management plan are adhered to and to raise awareness of the potential threat of invasive species.

- Wheel washes shall be put in place at entry and exit points, if considered appropriate. Wastewater from these facilities will need to be stored and treated to avoid further outbreaks.
- If operating within an area of known infestation all machinery, vehicles, equipment, foot ware and clothing will need to be cleaned thoroughly (if necessary, using steam cleaners) in a contained area to avoid further contamination.

Option 1- Excavation of the entire root system is thought to be a very effective method of Snowberry control. This must be done before the plants' seeds ripen in autumn. Plant matter from this process can be disposed of using a licenced landfill site or may be buried to a depth of over 2m.

Any reproductive plant material will be carefully disposed of following NRA (2010) Guidelines. Any equipment used will be inspected and thoroughly cleaned, as will the footwear and clothing of operatives removing invasive species material. Any material arising from cleaning of equipment and footwear will be disposed of in a manner which will not cause the spread of invasive species.

Fuchsia, Himalayan honeysuckle, Japanese rose, flowering red currant

These species are unlikely to be affected by Proposed Development works and as such the primary means of prevention of spread is avoidance. If interaction with these species is unavoidable, any reproductive plant material will be carefully disposed of following NRA (2010) Guidelines. Any equipment used will be inspected and thoroughly cleaned, as will the footwear and clothing of operatives removing invasive species material. Any material arising from cleaning of equipment and footwear will be disposed of in a manner which will not cause the spread of invasive species.

4.3 Measures of success

- Continual monitoring of Site for signs of regrowth of all invasive species during operational phase – presence, distribution and extent of species will be used as an indicator of success with eradication representing complete success;
- Site to be monitored annually during operational phase years 1-5, 10, 15 and 20 during the growing season for signs of regrowth of all invasive species – presence, distribution and extent of species will be used as an indicator of success with eradication representing complete success.

5.0 Implementation

5.1 Roles and Responsibilities

The implementation of the HSMP will be overseen by a suitably qualified person or persons, typically an ecologist with the required experience and expertise, appointed by Coolglass Wind Farm Ltd.

All management tasks carried out under the HSMP will either be undertaken by the developer, operator or by suitably experienced contractors acting on their behalf, and all ecological monitoring will be undertaken by suitably qualified and experienced ecologists.

An ecologist or horticulturalist with experience of the identification and removal of IAS will be employed to carry out the manual removal of the IAS.

5.2 Management and Monitoring Schedule

The monitoring schedule is shown in Table 5-1 below.

Table 5-1: Monitoring Schedule

Ecological feature	Management works (summary)	Management schedule	Measures to be reported on	Reporting Schedule
Habitats	Hedgerow / treeline creation and enhancement: 938 m of hedgerow and 141 m of treeline	Operational year 1	Details of planting including species composition and locations	Operational year 1
	Hedgerow / treeline checking	Operational years 2-5, 10, 15 and 20	Details of dimensions / species composition of relevant hedgerows / treelines and any remedial actions required	Once a year for operational years 1-5, 10, 15 and 20
Birds	Maintenance of low vegetation height around turbines to deter kestrels	Throughout lifespan of Proposed Development	Height of vegetation and suitability for kestrel prey species	Once a year for operational years 1-5
	Checks to ensure areas around turbines unsuitable for kestrels	Once a year for operational years 1-5		
	Bird box erection: 1 no. swift tower	Operational year 1	Details of structures erected and locations of structures	Operational year 1
	Bird box checking (inspections of nest structures must be made outside of breeding season for relevant species)	Once a year for operational years 2-5	Presence/absence of birds, evidence of box/structure usage and whether box/structure needs repairing/replacing	Once a year for operational years 2-5
Hedgehogs	Creation of log piles: 8 no.	Operational year 1	Presence/absence of hibernacula,	

Ecological feature	Management works (summary)	Management schedule	Measures to be reported on	Reporting Schedule
Reptiles and amphibians	Checks for hedgehog hibernacula	Operational years 2-5	evidence of hedgehog usage and remedial measures required	Once a year for operational years 1-5
	Creation of log piles: 8 no. (separate to those for hedgehogs)	Operational year 1	Presence/absence of hibernacula, evidence of reptile/amphibian usage and remedial measures required	Once a year for operational years 1-5
Pollinating insects	Checks for reptile hibernacula	Operational years 2-5	Locations and details of measures implemented and any remedial measures required	Once a year for operational year 1
	Creation of 5 m rough grassland buffers	Operational year 1	Location and details of measures implemented	Once a year for operational years 2-5
	Grassland buffer checking	Operational years 2-5	Evidence of usage by relevant invertebrates and whether any remedial measures are required	Once a year for operational year 1
	Insect hotel erection (3 insect hotels per 35 ha)	Operational year 1		Once a year for operational years 1-5, 15 and 20
Invasive Species	Insect hotel checking	Operational years 2-5		
	Pre-construction survey	Prior to construction	IAS presence, distribution and extent	Prior to construction
	Invasive species management	Operational years 1-5, 10 and 15	IAS presence, distribution and extent, management measures undertaken if required	Operational years 1-5, 10, 15 and 10

5.3 Reporting and Reviewing

This HSMP has been developed using NatureScot (formerly SNH) guidance (SNH, 2016) and following the recommendations of this guidance monitoring is proposed to measure success of the management measures and to identify whether remedial measures are required if objectives are not being met.

Monitoring results will be reported on an annual basis (during years in which monitoring takes place) and if necessary (e.g. if stated objectives were not being met), recommendations made for reasonable changes to management prescriptions, as appropriate. Monitoring reports will be submitted to Planning Authority and any changes proposed to management prescriptions would be discussed with them in the first instance.

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1.0 Figures

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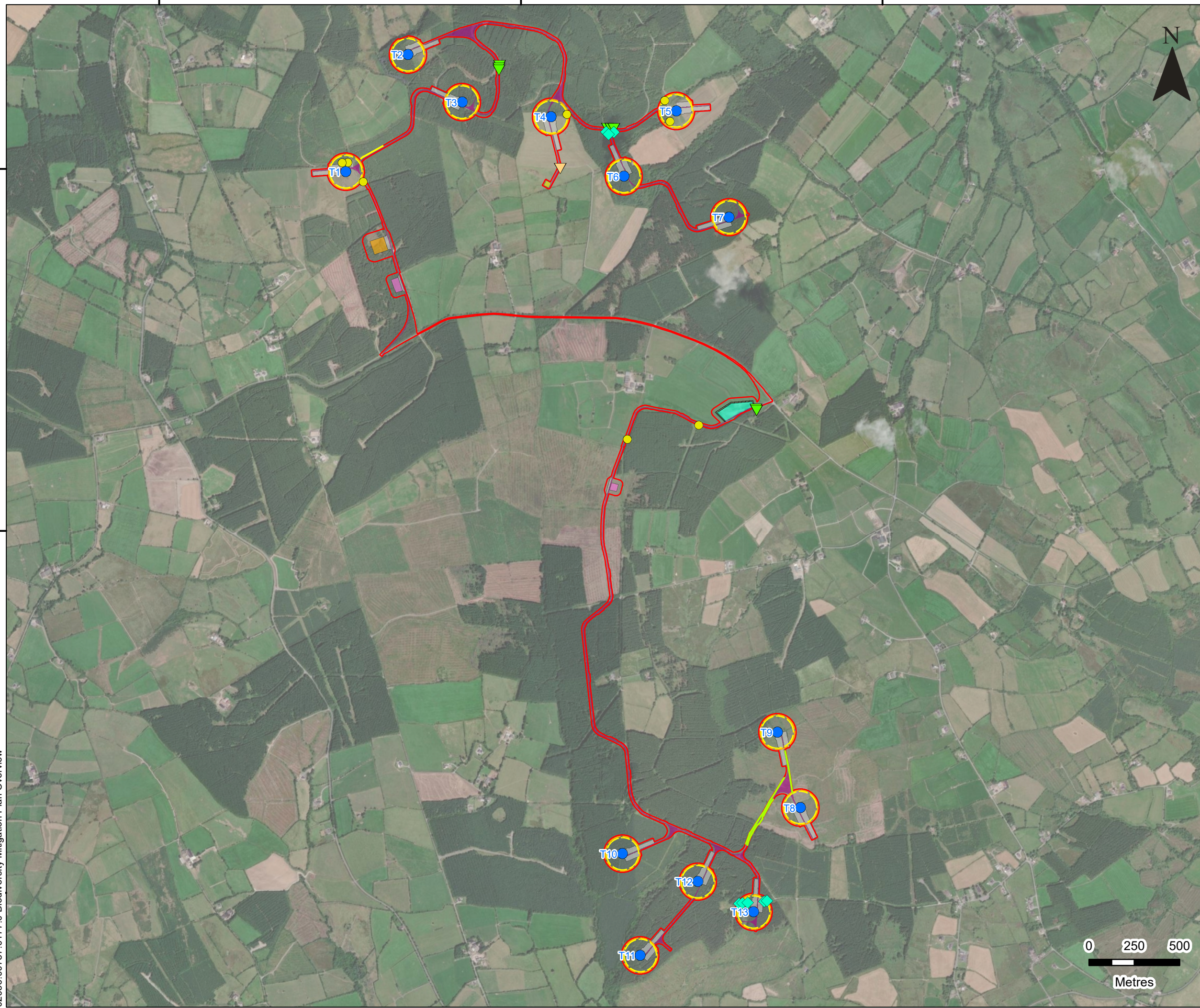
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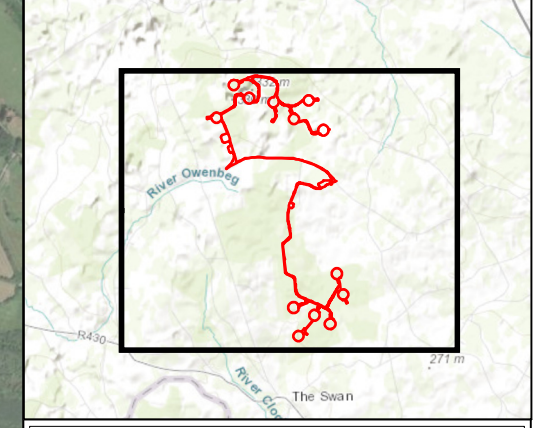
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LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Layout
- Proposed Substation Compound
- Proposed Temporary Construction Compound
- Proposed Borrow Pit
- Proposed Hardstanding
- Proposed Access Track
- Proposed Met Mast Hardstanding
- Proposed Swift Tower
- Proposed Insect Hotel
- Proposed Hedgehog Hibernacula
- Proposed Amphibian/Reptile Hibernacula
- Proposed Treeline Planting*
- Proposed Hedgerow Planting*
- Proposed Rough Grassland for Pollinators*

*See Habitat and Species Management Plan for details on species mix.



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MANAGEMENT PLAN**

BIODIVERSITY MITIGATION PLAN

FIGURE 1-a

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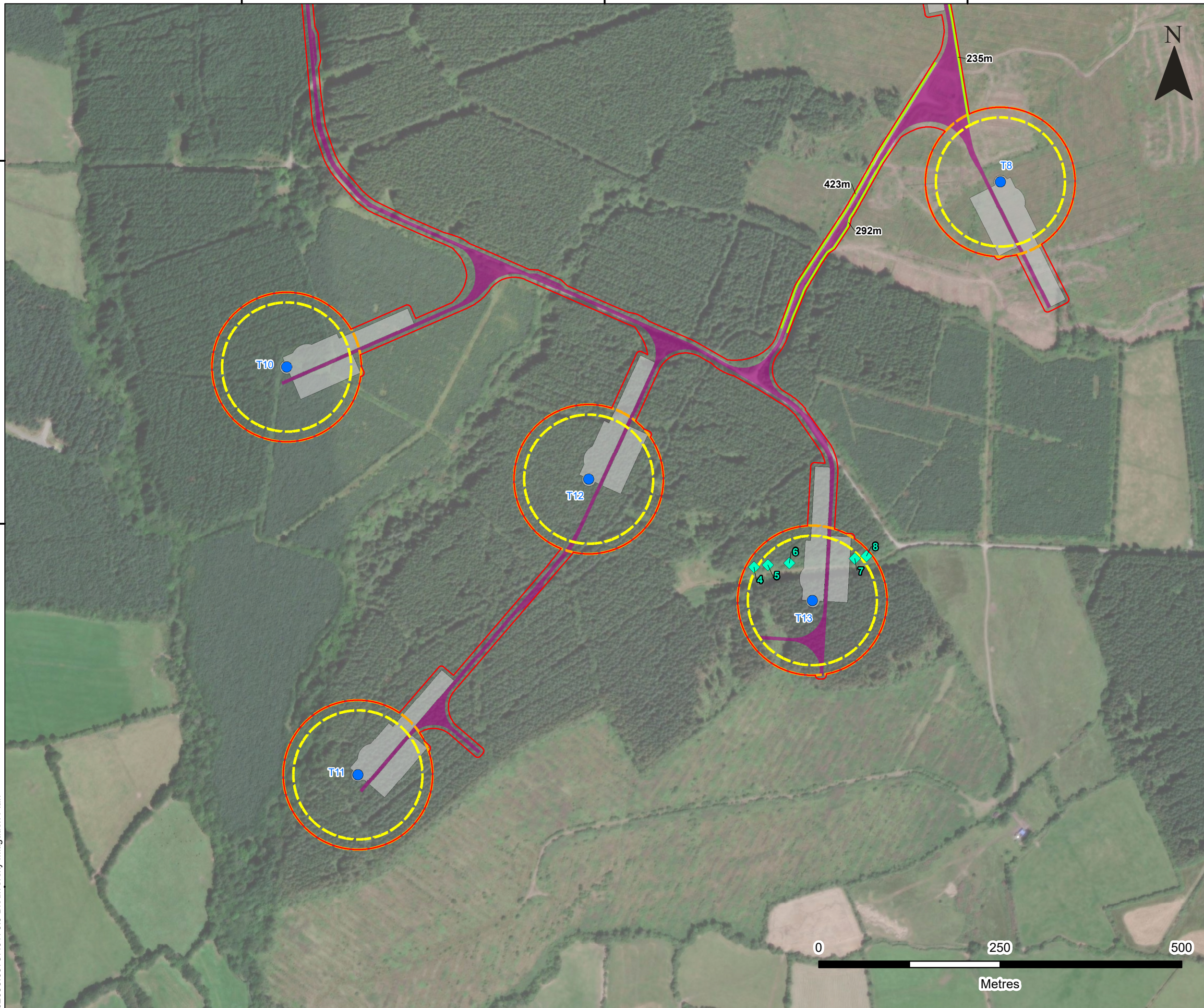
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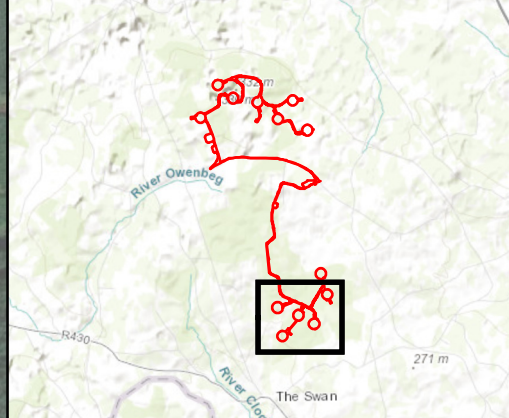
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LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Layout
- Proposed Hardstanding
- Proposed Access Track
- Hedgerow Felling Buffer (89 m)
- Woodland and Treeline Felling Buffer (103 m)
- ◆ Proposed Hedgehog Hibernacula
- Proposed Hedgerow Planting*

*See Habitat and Species Management Plan for details on species mix.



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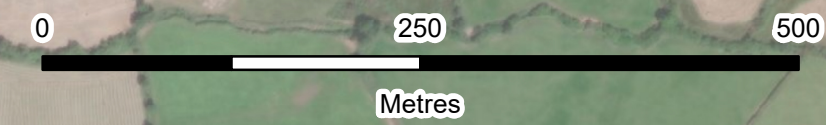
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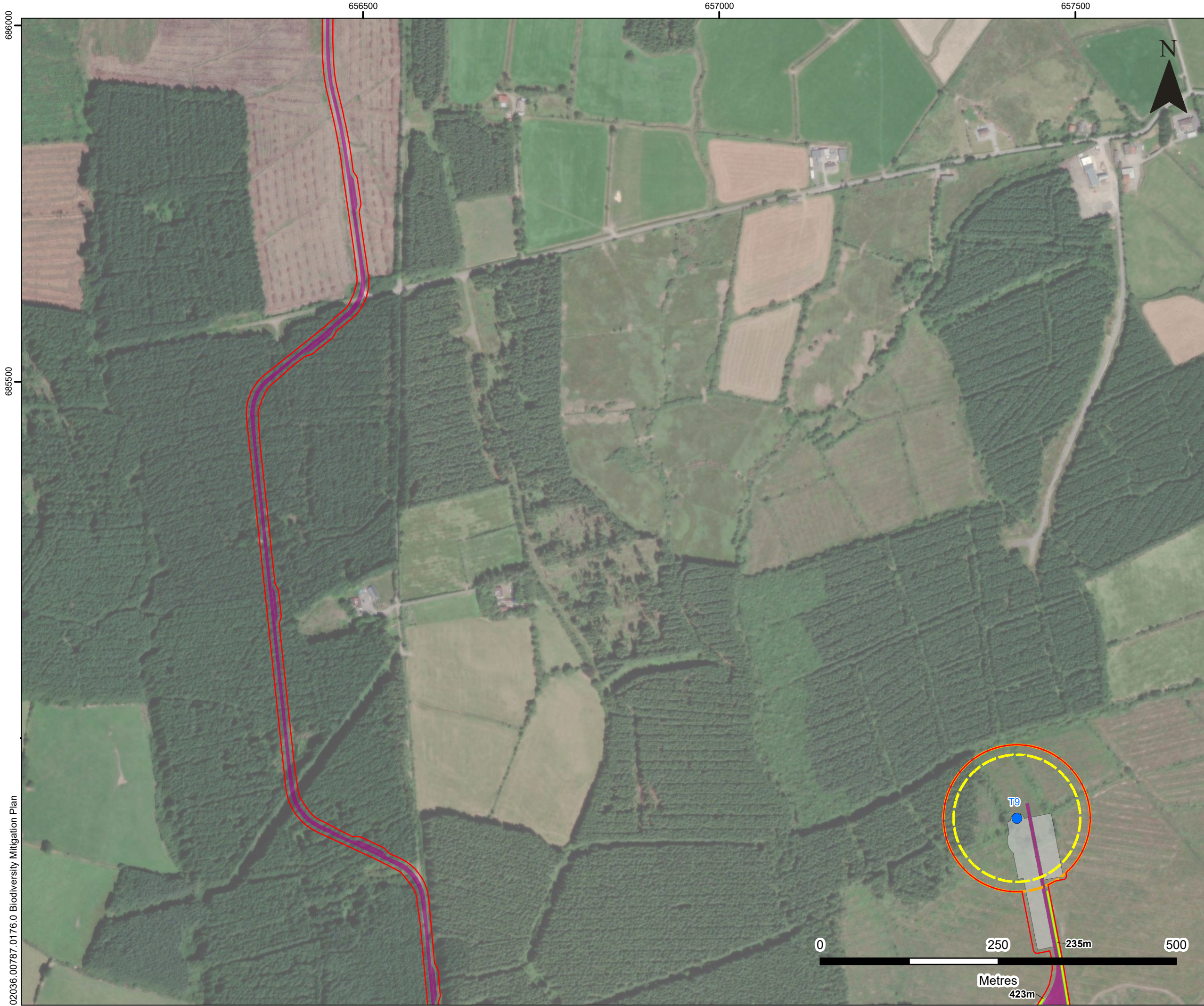
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MANAGEMENT PLAN**

BIODIVERSITY MITIGATION PLAN

FIGURE 1-b

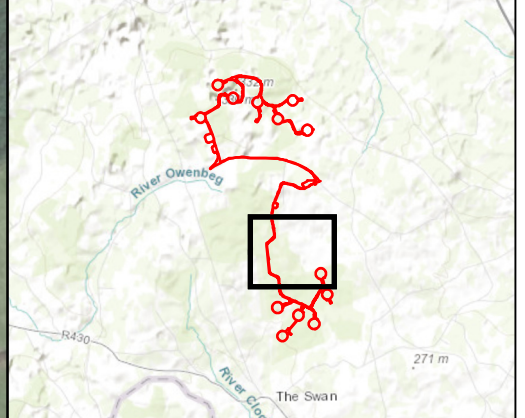
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- LEGEND**
- Proposed Development Site Boundary
 - Proposed Turbine Layout
 - Proposed Hardstanding
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 - Hedgerow Felling Buffer (89 m)
 - Woodland and Treeline Felling Buffer (103 m)
 - Proposed Hedgerow Planting*

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FIGURE 1-c

Scale 1:5,000 @ A3 Date JULY 2023

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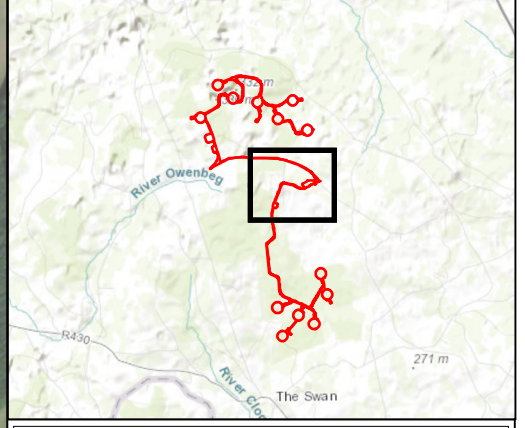
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LEGEND

- Proposed Development Site Boundary
- Proposed Temporary Construction Compound
- Proposed Borrow Pit
- Proposed Hardstanding
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- Proposed Insect Hotel
- Proposed Amphibian/Reptile Hibernacula
- Proposed Rough Grassland for Pollinators*

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FIGURE 1-d

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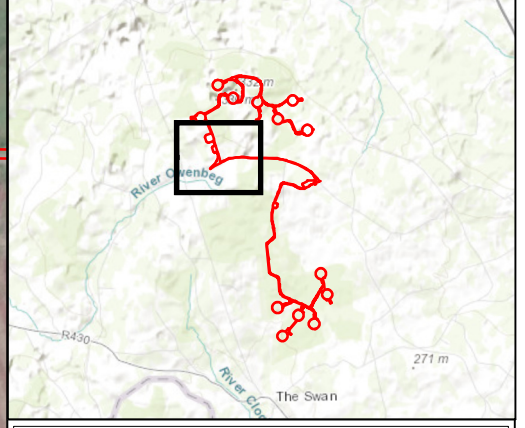
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LEGEND

- Proposed Development Site Boundary
- Proposed Substation Compound
- Proposed Temporary Construction Compound
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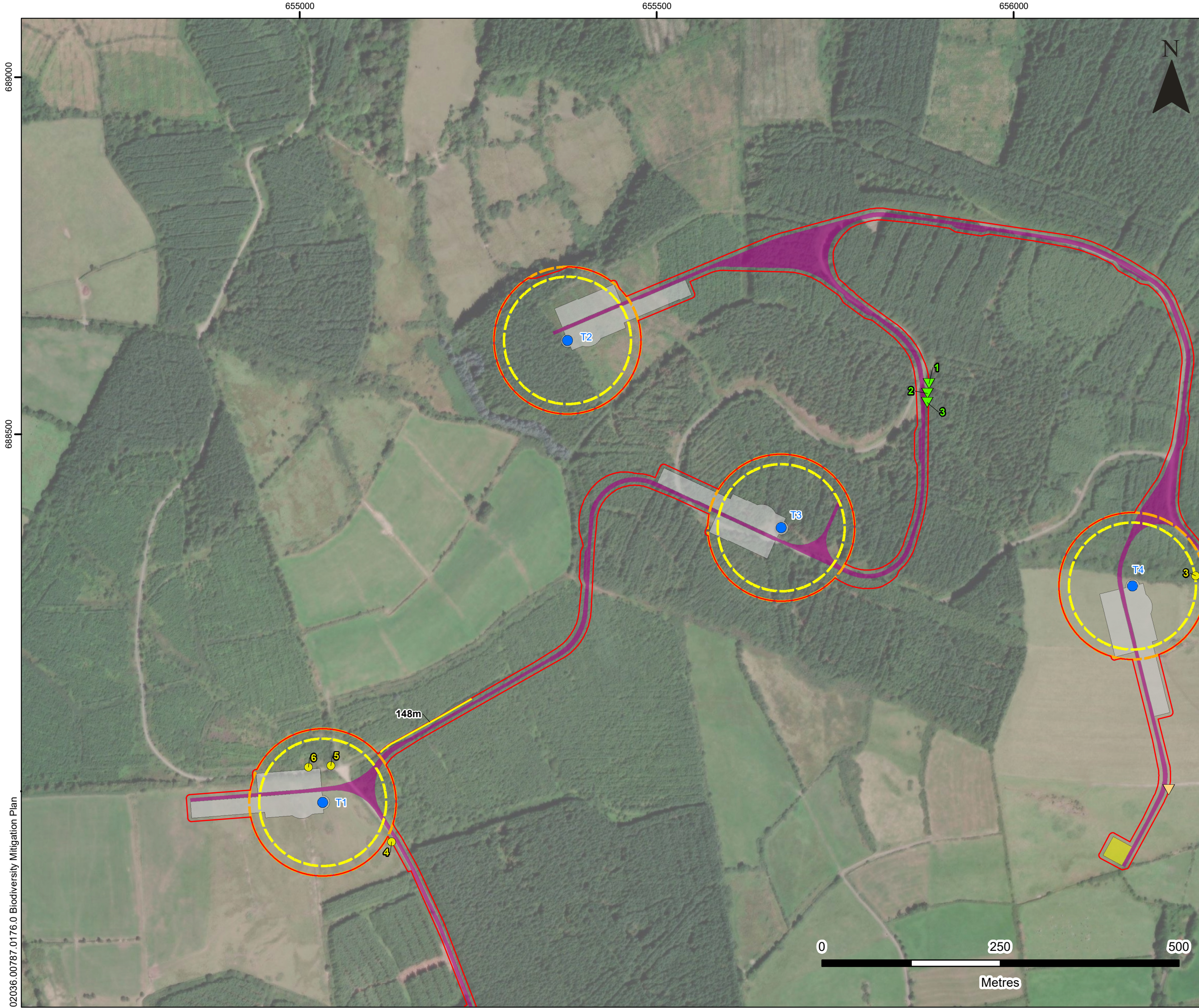
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FIGURE 1-e

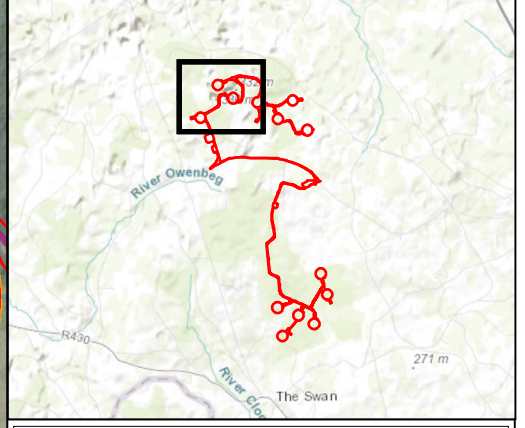
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LEGEND

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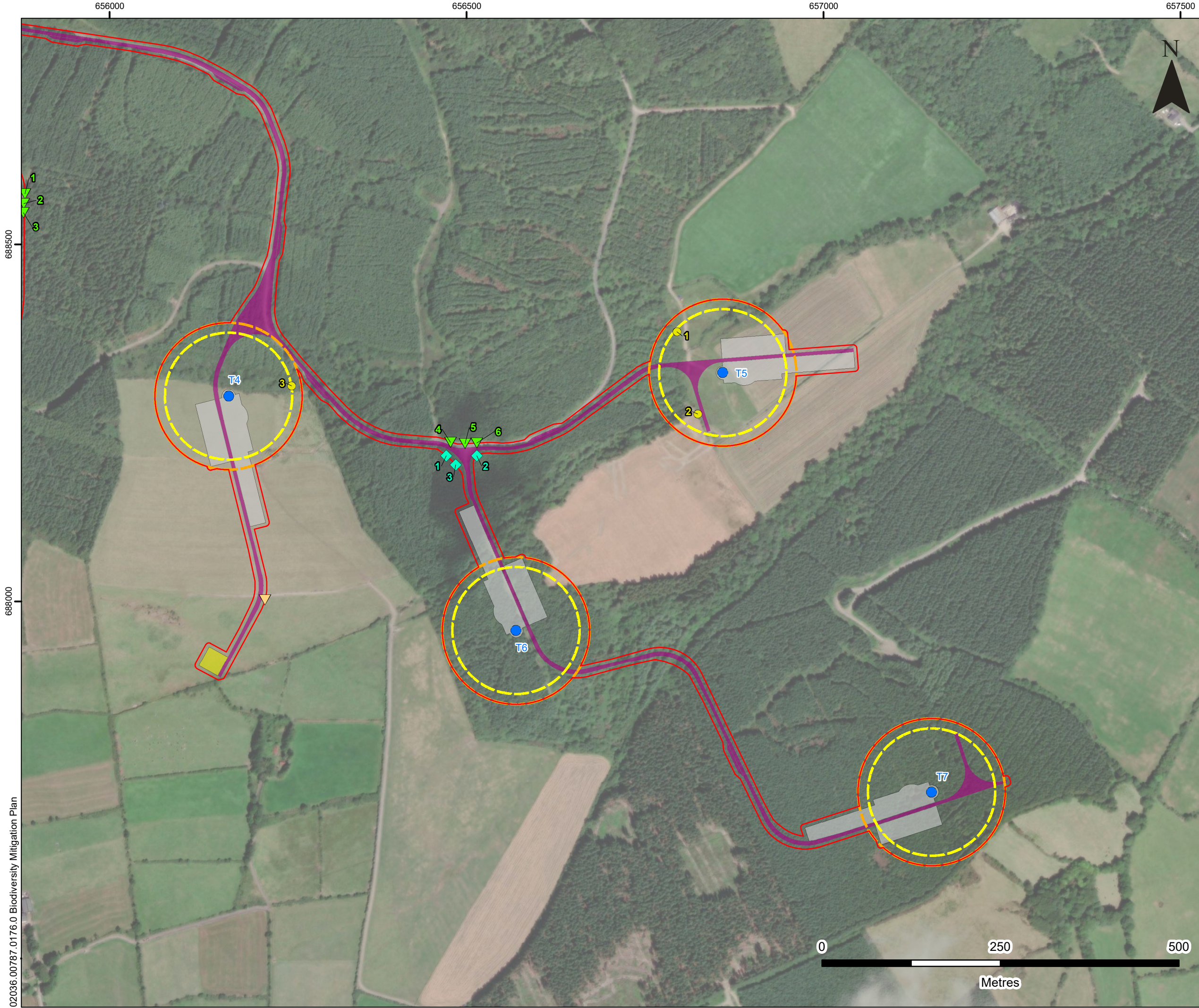
FIGURE 1-f

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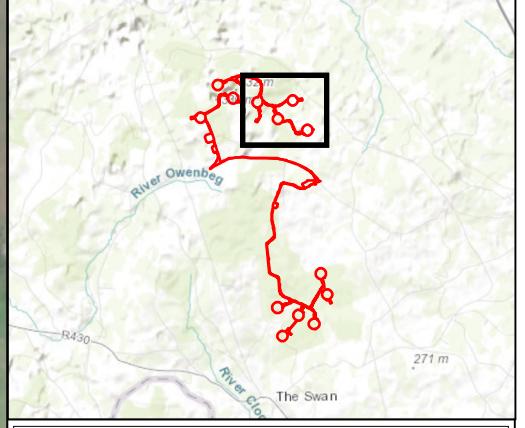
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FIGURE 1-g

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