A survey to assess the woodlands and associated semi-natural habitats at Rathcoole, Co. Dublin

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Executive summary

An ecological survey was carried out to investigate the habitats present in an area of semi-natural vegetation that has existed without significant human intervention for the past 30 years at Rathcoole, Co. Dublin and to evaluate their importance on a local and national scale. Previous surveys had found that a large and significant area of the Priority Annex I habitat 91E0 Alluvial woodland is present, a habitat which Ireland has an obligation to protect under the EU Habitats Directive. Areas of two other rare Annex I habitats, 6510 Lowland hay meadow and 7220 Petrifying springs, were also identified as present by previous surveys. The presence of all three Annex I habitats was confirmed by this survey, occurring as part of a rich mosaic of natural habitats. The largest area of habitat present, covering an area of 12.8ha, is alluvial woodland, which was assessed using standard monitoring methodology, and was found to correspond fully to the Annex I habitat and to be in good condition. This is an uncommon habitat in Co. Dublin, and in Ireland as a whole, so this site is highly important for this habitat, in both a local and broader context. In addition, an area of species-rich Lowland hay meadow was found to correspond to Annex I habitat, and is also of high conservation importance. Although the majority of remaining habitat areas do not correspond to any Annex I habitat types, they are essential in retaining the integrity and functioning of the adjacent Annex I habitats, and have high biodiversity value in their own right, particularly considering the lack of semi-natural habitats in the surrounding areas, which are dominated either by urban development or intensive agriculture. Furthermore, these areas represent areas that will in time either develop into Annex I Alluvial woodland or, with the correct management, could transition into Annex I Lowland hay meadow. Taken as a whole, this site is of very high ecological and biodiversity value and it is imperative that it is protected and managed correctly into the future, as a key local biodiversity area, of great benefit to both local wildlife and to the local community.

1 Introduction

This survey was commissioned to investigate and assess the habitats present on lands in Rathcoole, Co. Dublin which are the subject of a South Dublin County Council (SDCC) master plan. This land was purchased in the early 1990s by SDCC with the intention of providing an amenity area, part of which is now Rathcoole Park, and developing the rest, which has had little recent human intervention. Development has not taken place to date, resulting in the transitioning of this land from agricultural fields to a mosaic of semi-natural woodland and grassland habitat. This area of habitat forms both a vital refuge for wildlife in an area with little other remaining natural vegetation, and is an important location for residents to exercise and connect with nature. The draft Masterplan for the lands, prepared by SDCC, proposes extensive development of the lands, including housing, a school and football pitches. Just prior to undertaking the surveys, on June 14th 2021, SDCC acknowledged the presence of priority Annex I Alluvial woodland, alongside other Annex I habitats. However, the Council have yet to establish the extent of Alluvial woodland and are going back to the drawing board to see how the master plan can be delivered.

A number of surveys have been carried out since 2019 to characterise and assess the habitats present, most of which focused on the woodland area, as follows:

- A tree review undertaken by Brady Shipman Martin (2019) concluded that the woodlands were of little arboricultural value, but of some ecological significance, with the majority of trees of note located along old hedgerows on the boundary of and within the woodland.
- An assessment of the woodland by Mac Diarmada & Associates (2020) concluded that there are areas of maturing wet willow-alder-ash woodland (WN6 in the classification of Fossitt, 2000), immature woodland (WN2) and scrub (WS1) present, with the majority of woodland consisting of mature or immature wet woodland. The report estimated that within 5-10 years, there could be upwards of 20,000 more mature trees in the woodland and that the proposed development would destroy the integrity of the woodland. The current estimate of trees is 11,950 upwards to 12,224 mature trees and over 70,000 tree whips.

- A preliminary ecological appraisal (Brady Shipman Martin, 2020) determined that, although not at full maturity, the woodlands were of Local Importance (Higher Value), following the criteria of NRA (2009), and of importance for biodiversity in a local context.
- An independent survey by Daly (2020) investigated the affinities of the woodland to the Priority (*) Annex I Habitat 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* as listed under the EU Habitats Directive. The results of the survey showed that all four plots recorded within the woodland corresponded to the Annex habitat, and that the woodland should be considered as an example of 91E0 Alluvial woodland.
- Further studies carried out under the supervision of Brady Shipman Martin, as yet unreleased (http://www.sdublincoco.ie/Meetings/ViewDocument/70801 "H14 Major Housing Developments Update"), confirmed that the woodland corresponds to Annex habitat 91E0 Alluvial woodland, and also discovered the presence of two further Annex I habitats on the site, 6510 Lowland hay meadow and 7220 Petrifying springs with tufa formation.

The results of the present survey will confirm the finding of the previous reports and assess the importance and value of this site in a local and national context.

2 Methodology

Before visiting the site, all available reports were consulted in order to become familiar with their finding and determine which areas required specific attention, especially those that may contain Annex habitats. Fieldwork was carried out on the 15th and 18th of June 2021 and all parts of the site, as defined in the SDCC Masterplan, were surveyed. Initially, the entire site was walked over, and the habitats present were noted and delineated, species lists were recorded for each habitat area and notes were taken on any relevant management issues. Where necessary, waypoints were taken using a handheld Garmin GPS, for example where notable species were found. Habitats were classified in the field to the level of Fossitt (2000), with later classification under the Irish Vegetation Classification (IVC) carried out using the ERICA tool (Perrin, 2019). Habitats were mapped on a broad scale to Annex, Fossitt and IVC level, delineating the main habitat units present.

The woodland area was assessed using the standard methodology of the National Survey of Native Woodland (NSNW: Perrin et al., 2008; O'Neill and Barron, 2013). Four quadrats (Figure 3) were recorded at locations spaced throughout the woodland, with placing ensuring that areas not assessed, or considered to correspond less strongly to Annex habitat, by previous surveys were assessed. Each quadrat was of 20 x 20m area, and the percentage cover of all species of plant (including mosses and liverworts) within the quadrat was recorded. In addition, the percent cover of the following was recorded from each plot: bare soil, bare rock, litter (decaying plant material), dead wood, surface water, ground layer, field layer and canopy layer. Each plot was then assessed using the assessment methodology of O'Neill and Barron (2013), first of all to establish whether it corresponds to 91E0 Alluvial woodland and secondly to assess its condition and the impacts of pressures and threats. The assessment was then applied at a four-plot level to establish the overall status of the woodland. In addition, an assessment was carried out of the area of 6510 Lowland hay meadow, following the methodology of Martin et al. (2018), but a full quadrat was not deemed necessary, as the assessment captures the majority of data needed to characterise this habitat. Also, a quadrat of 5 x 5m area was taken in an area of immature woodland/scrub, at the eastern end of the site, which is currently transitional between grassland and woodland, to investigate its composition and future trajectory. No assessment was undertaken of this plot, as it does not currently correspond to any Annex I habitat, being too poorly developed in terms of structure and species composition to qualify as 91E0 Alluvial woodland. Although an area of 7220 Petrifying springs with tufa deposits was encountered, no assessment was undertaken of this habitat, as it was impossible to assess its extent or composition due to a dense covering of down from willow catkins, which was covering the spring at the time of the survey.

3 Results

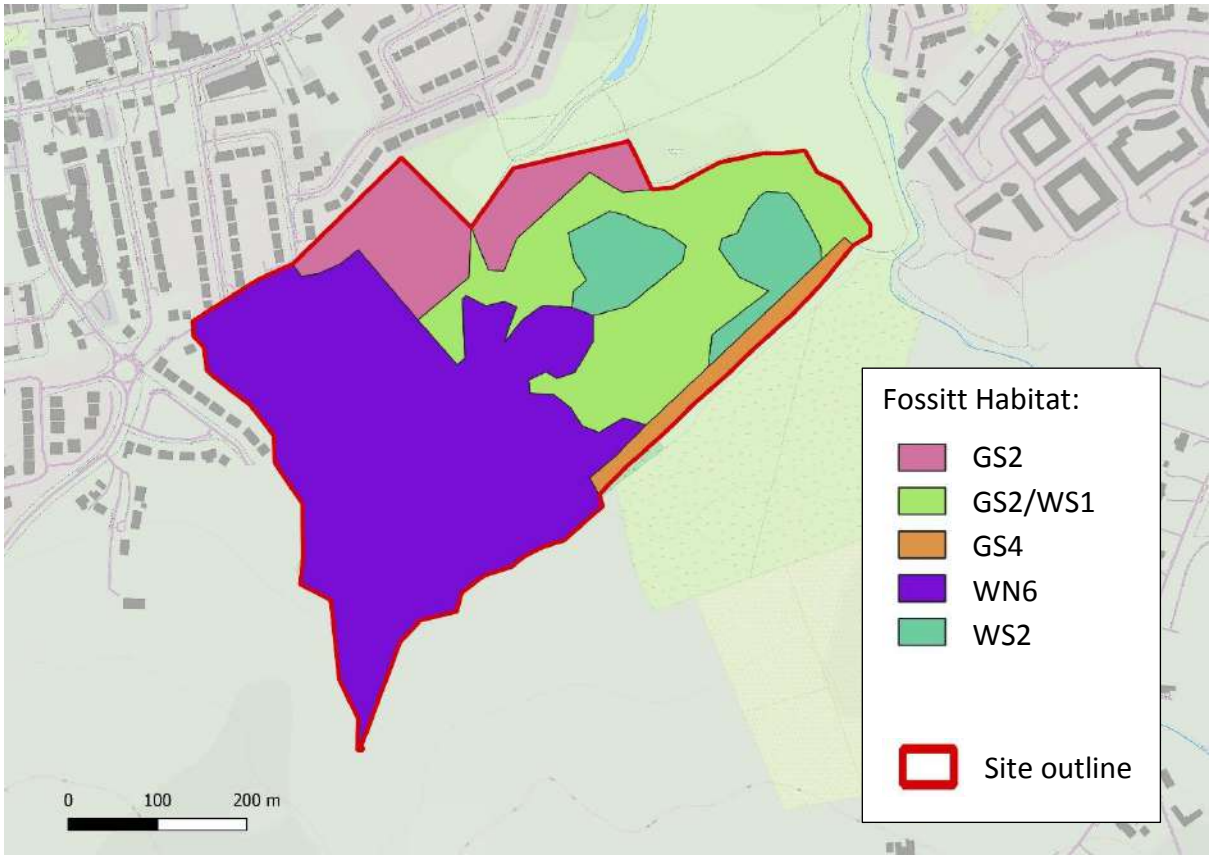
3.1 Overview of habitats present

The study area of 24ha can be categorised as woodland and grassland, occurring in places in an intimate mosaic. The wooded area comprises 12.8ha. The grassland area comprises 9.2ha, including areas which are in mosaic with scrub. The remaining area of 2ha consists of immature woodland and scrub, which will soon become woodland. The woodland area is

predominantly located on the west of the study area, with small pockets of grassland contained within. The grassland is located in the eastern section, with substantial pockets of woodland within this grassland area.

The majority of habitat present is either WN6 Wet willow-alder-ash woodland (after Fossitt, 2000) or GS2 Dry meadows and grassy verges, much of which is in mosaic with WS1 Scrub (Figure 1). There are also areas of WS2 Immature woodland and GS4 Wet grassland. The WN6 corresponds primarily to the IVC (Perrin, 2016) community WL3D *Salix cinerea - Urtica dioica* woodland, with minor variations that may also have some affinities with other IVC communities.

Figure 1: Map showing the habitats present at Rathcoole, following the classification of Fossitt (2000). GS2 refers to Dry meadows and grassy verges, WS1 refers to Scrub, GS4 refers to Wet grassland, WN6 refers to Wet woodland and WS2 refers to Immature woodland. See Figure 2 for classification of Annex I habitats. Base map © OpenStreetMap contributors https://www.openstreetmap.org/copyright.



The northeastern-most area of the GS2, adjacent to Rathcoole Park, corresponds well with GL3E *Festuca rubra - Rhinanthus minor* grassland, while the other grassland areas are closest in composition to GL3C *Festuca rubra - Plantago lanceolata* grassland, although the affinity is not strong. The strip of GS4 along the southeastern margin of the site also does not show a strong affinity to any IVC community, but is closest in composition to GL1B *Agrostis stolonifera - Filipendula ulmaria* marsh-grassland. It was not possible to classify the areas of developing woodland to any IVC community, as they contain a mix of species of wet woodland and grassland, so they were assigned as 'transitional'.

Two areas were determined to correspond to Annex I habitats, with an additional Annex I habitat occurring at one location, as a point feature (Figure 2). The entirety of the woodland occupying the western portion of the site was found to show a strong affinity to the priority Annex I habitat 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*. There are some open grassy areas and patches of scrub within the woodland, but these are part of the woodland mosaic, so were not mapped separately. A spring within the woodland contains some tufa deposits and corresponds to the priority Annex I habitat 7220 Petrifying springs with tufa deposits (Photo A11). The area of flower-rich meadow, located adjacent to the park on the northern margin of the site, shows a clear correspondence to the Annex I habitat 6510 Lowland hay meadow.

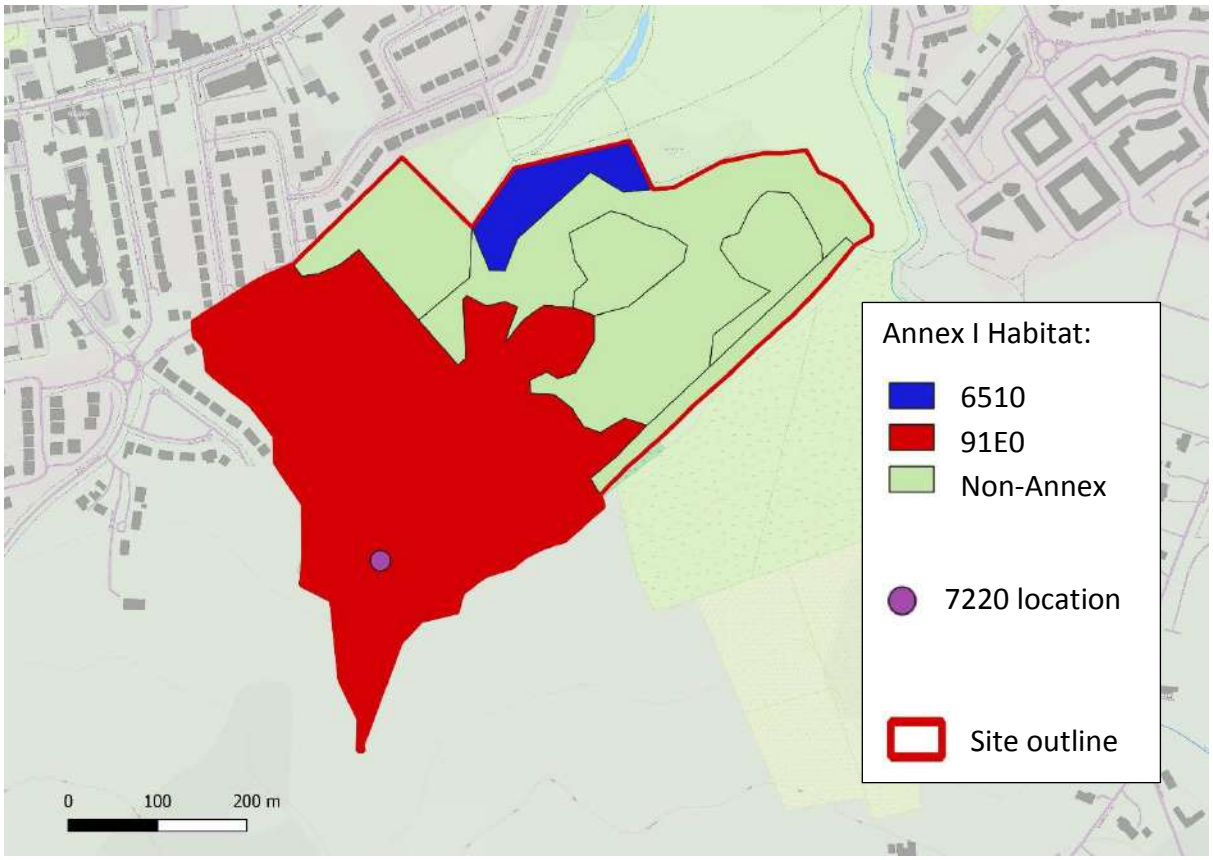
3.2 Description and assessment of habitat areas

3.2.1 Wet woodland

Wet woodland, corresponding to the Annex I habitat 91E0 Alluvial woodland, occupies 12.8ha in the western part of the site. Its canopy, which is mostly between six and eight metres high, is dominated by multi-stemmed Grey Willow (*Salix cinerea*) of small girth, with scattered large-girthed Goat Willow (*Salix caprea*) and Downy Birch (*Betula pubescens*) throughout (Appendix 1). The ground layer varies from sparse to dense, with areas of dense Bramble (*Rubus fruticosus* agg.), Nettle (*Urtica dioica*), Ivy (*Hedera hibernica*) and Rosebay Willowherb (*Chamerion angustifolium*) in places. Although there is no standing water, with the exception of where the tufa-containing spring occurs in the southwestern part of the wood, the ground is damp and muddy throughout, indicating that the water table is located close to the surface of the ground, hydrological conditions which are essential for the

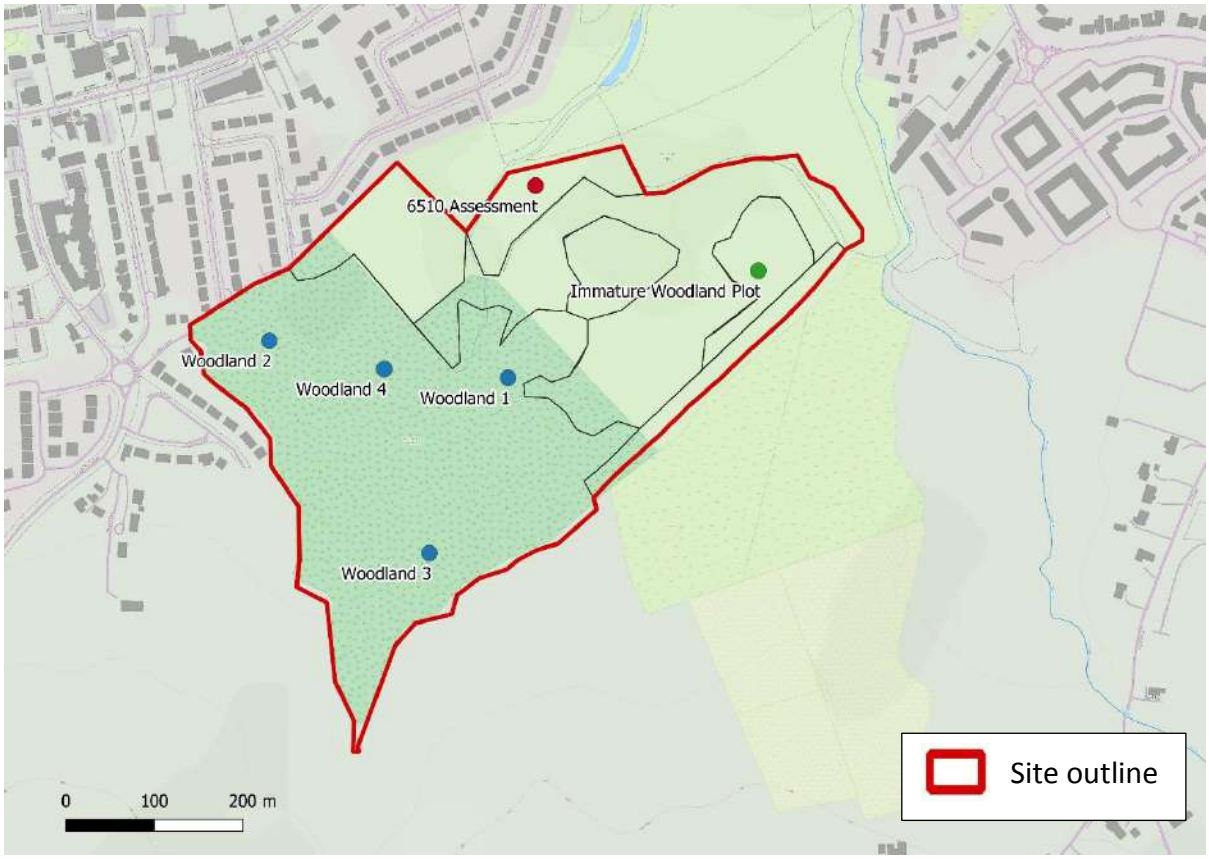
formation of wet woodland. Although there is some variation within the woodland, for example there is more Downy Birch in the canopy in the northern portion and the ground is slightly drier, and some parts are in the process of transitioning from scrub and grassland, the entire area can be considered as a continuous unit, with little variation in species composition, except in small pockets which are not of sufficient size to consider separately. This includes areas in the east and north of the woodlands that some previous surveys, as detailed in Section 1, have indicated as being of lower conservation value or as immature woodland.

Figure 2: Map of the Annex I habitats recorded at Rathcoole. Base map © OpenStreetMap contributors https://www.openstreetmap.org/copyright.



All four plots recorded (Figure 3; Appendix 2; Photos A1-A4) passed the assessment on the number of positive indicator species present, with between seven and nine recorded per plot (Table 1). All quadrats also contained two or three target species. All plots passed the assessment on most of the ten criteria, but three out of the four failed on one criterion.

Figure 3: Map of the location of quadrats and assessment plots recorded at Rathcoole. 'Woodland 1-4' refer to the four quadrats and assessment plots recorded in 91E0 Alluvial woodland habitat. Base map © OpenStreetMap contributors https://www.openstreetmap.org/copyright.



However, to pass overall, eight or more criteria are required to be passed (O'Neill and Barron, 2013), so all plots passed the assessment overall. Plot one, recorded from the eastern part of the woodland, failed on canopy height, as the canopy was measured as 6m, with the criterion to pass set at 7m. Plot two, in the northern part of the woodland, failed the criterion on the presence of regeneration of non-native species, namely Cotoneaster (*Cotoneaster* sp.) and Sycamore (*Acer pseudoplatanus*), although neither species covered a significant area of the plot. Plot three failed on one criterion, due to sparse cover of native shrub layer, with a shrub layer present in only 5% of the plot, the criterion being set at 10%. On a four-plot level, one assessment criterion failed as a result of the lack of dead wood, with no dead wood present in any of the plots of 20cm diameter or more. A single fail is allowed on the four-plot level, so overall, the woodland passes the Structure and Function assessment, and can be considered as Favourable (green). The failures on canopy height and

Table 1: Results of the assessment of the four plots taken within 91E0 Alluvial woodland. See Appendix 2 for specific details of the assessments and O'Neill and Barron (2013) for further details on the assessment criteria.

Plot		1		2		3		4	
Criterion	Target	Result	Pass/Fail	Result	Pass/Fail	Result	Pass/Fail	Result	Pass/Fail
Positive species	6 species present	9	Pass	7	Pass	7	Pass	7	Pass
	Target spp. present	Y	Pass	Y	Pass	Y	Pass	Y	Pass
Negative species cover	≤ 10%	0	Pass	1	Pass	0	Pass	0	Pass
Negative species regeneration	Absent	Y	Pass	N	Fail	Y	Pass	Y	Pass
Median canopy height	≥ 7m	6	Fail	8	Pass	7	Pass	7	Pass
Total canopy cover	≥ 30%	90	Pass	85	Pass	95	Pass	85	Pass
Proportion of target spp. in canopy	≥ 50%	100	Pass	75	Pass	100	Pass	80	Pass
Native shrub layer cover	10-50%	10	Pass	25	Pass	5	Fail	10	Pass
Native dwarf shrub/field layer cover	≥ 20%	25	Pass	80	Pass	35	Pass	10	Pass
Native dwarf shrub/field layer height	≥ 20cm	50	Pass	30	Pass	60	Pass	40	Pass
Bryophyte cover	≥ 4%	10	Pass	10	Pass	15	Pass	25	Pass
Grazing pressure	No overgrazing	Y	Pass	Y	Pass	Y	Pass	Y	Pass
4-plot level									
Target sp. DBH	At least 1 of each size class present	Y	Pass						
Target sp. free regeneration	≥1 sapling ≥ 2m tall	Y	Pass						
Other native spp. free regeneration	≥1 sapling ≥ 2m tall in 2+ plots	Y	Pass						
Old trees and dead wood	≥3 with DBH ≥20cm	N	Fail						

lack of dead wood are likely due to the relatively young age of this woodland, and in time these criteria would be passed. These results support and verify the finding of Daly (2020), who also concluded that this area corresponds to the priority EU Habits Directive Annex I Habitat 91E0 Alluvial woodland. These findings are reproduced, with permission, in Appendix 6.

In terms of Future Prospects, the only current impact noted is the presence of a number of non-native species (see section 3.4 for more details) which, although not currently having a significant effect on the structure and function of the woodland, is likely to become an issue without mitigation and control measures. Therefore, the Future Prospects can be considered to be Unfavourable-inadequate (amber) at present. If any development were to go ahead within part or all of the woodland area, the Future Prospects would have to be considered to be Unfavourable-bad (red), as the woodland would effectively cease to exists as a functioning system.

3.2.2 Grassland

The eastern portion of the site is primarily grassland habitat, which covers a total area of 9.2ha (Figure 1), interspersed in parts with patches of scrub. The largest area of grassland is a rough meadow (GS2 Dry meadow/GL3C *Festuca rubra - Plantago lanceolata* grassland, mostly in mosaic with WS1 Scrub), covering an area of 7.4ha (Photo A5). It forms a tall, dense sward, dominated by coarse grasses including False Oat Grass (*Arrhenatherum elatius*), Yorkshire Fog (*Holcus lanatus*), Meadow Foxtail (*Alopecurus pratensis*), Meadow Fescue (*Schedonorus pratensis*) and Red Fescue (*Festuca rubra*), with forbs including Bush Vetch (*Vicia sepium*), Meadow Buttercup (*Ranunculus acris*), Smooth Hawksbeard (*Crepis capillaris*), Cowslip (*Primula veris*) and Meadow Vetchling (*Lathyrus pratensis*). There are a number of slight hollows, which support species more typical of wet grassland, including Compact Rush (*Juncus conglomeratus*), Meadowsweet (*Filipendula ulmaria*) and Marsh Valerian (*Valeriana officinalis*), as well as small areas approaching tall herb swamp with Iris (*Iris pseudacorus*), Meadowsweet and Reed-canary Grass (*Phalarus arundinacea*). Small stands of scrub are also present dotted through the grassland, with Common Gorse (*Ulex europaeus*), Bramble, Hawthorn (*Crataegus monogyna*), Dog Rose (*Rosa canina*) and Grey Willow.

A strip of species-rich wet grassland (GS4 Wet grassland/ GL1B *Agrostis stolonifera* - *Filipendula ulmaria* marsh-grassland), covering 0.8ha, runs along the southeastern margin of the site, in an area that may have previously been dug up or disturbed (Photo A6). In addition to grasses such as Yorkshire Fog, Crested Dog's Tail (*Cynosurus cristatus*), Sweet Vernal Grass (*Anthoxanthum odoratum*) and Creeping Bent (*Agrostis stolonifera*) and sedges including Glaucous Sedge (*Carex flacca*) and Hairy Sedge (*Carex hirta*), there is a rich array of forbs present. These include frequent Common Spotted Orchid (*Dactylorhiza fuchsii*; Photo A14), Meadowsweet, Creeping Buttercup (*Ranunculus repens*), Marsh Valerian, Wild Angelica (*Angelica sylvestris*) and Cuckoo Flower (*Cardamine pratensis*).

A flower-rich meadow (GS2 Dry meadow/ GL3E *Festuca rubra* - *Rhinanthus minor* grassland), which is mown annually, occurs along the northern margin of the site (Photo A7), occupying an area of 1ha, which corresponds with the EU Annex I habitat 6510 Lowland hay meadow (Figure 2). This area of meadow continues to the east alongside the park, but the eastern portion was not mapped or surveyed in detail, as it is outside the area of interest. Broad leaved herbs are abundant in this area, and include Common Spotted Orchid, Bee Orchid (*Ophrys apifera*), Ox-eyed Daisy (*Leucanthemum vulgare*), Knapweed (*Centaurea nigra*), Yellow Rattle (*Rhinanthus minor*), Common Hogweed (*Heracleum sphondylium*), Eyebright (*Euphrasia officinalis* agg.) and Tufted Vetch (*Vicia cracca*), alongside a range of grasses.

Table 2: Summary of the results of the assessment of the area of 6510 Lowland hay meadow. See Martin et al. (2018) for further details of the assessment methodology.

Assessment location	O0275626656	
Criteria	**Result**	**Pass/Fail**
Positive indicator species present ≥ 7	8	Pass
High quality indicator species present ≥ 1	3	Pass
Cover of non-natives ≤ 1	0%	Pass
Cover of negative indicators each ≤ 10%	*Trifolium repens* - 10%	Pass
Collective cover of negative indicators ≤ 20%	10%	Pass
Cover of scrub, bracken and heath ≤ 5%	0%	Pass
Forb component of forb:graminoid ratio 40-90%	60%	Pass
Proportion of sward 10-50cm tall ≥ 50%	70%	Pass
Litter cover ≤ 25%	1%	Pass
Cover of bare soil ≤ 5%	0.1%	Pass
Area of habitat in vicnity impacted by serious grazing or disturbance < 20m^2	0%	Pass

An assessment (Table 2) carried out on a 2 x 2m area of this vegetation (Photo A8) resulted in it passing on all criteria for 6510 Lowland hay meadow. Eight positive indicator species were present within the assessment plot, with a further four positive indicator species noted within the meadow as a whole (Appendix 3). A total of seven positive indicators are required to pass. Only one negative indicator species, White Clover (*Trifolium repens*) was located within the plot, with a cover of 10%, which is the maximum cover of a negative indicator species allowable to pass on that criterion. All other composition and structure criteria were passed, indicating the good health of this area of habitat.

3.2.3 Immature woodland

Interspersed within the rough grassland in the east of the site, there are areas of developing immature woodland and scrub (Photo A9), covering approximately 2ha. As demonstrated by a 5 x 5m quadrat (Appendix 1; Photo A10) taken in a representative stand of immature woodland, this vegetation is transitional between grassland and woodland. Although there is a dense canopy of Grey Willow, 4 - 5m high, the ground layer consists of moderately dense grasses, mainly Yorkshire Fog and Rough Meadowgrass (*Poa trivialis*). The only 91E0 Alluvial woodland indicator species recorded in the ground layer at present is Creeping Buttercup, but it is expected that other wet woodland indicator species would colonise in time.

3.3 Species of note

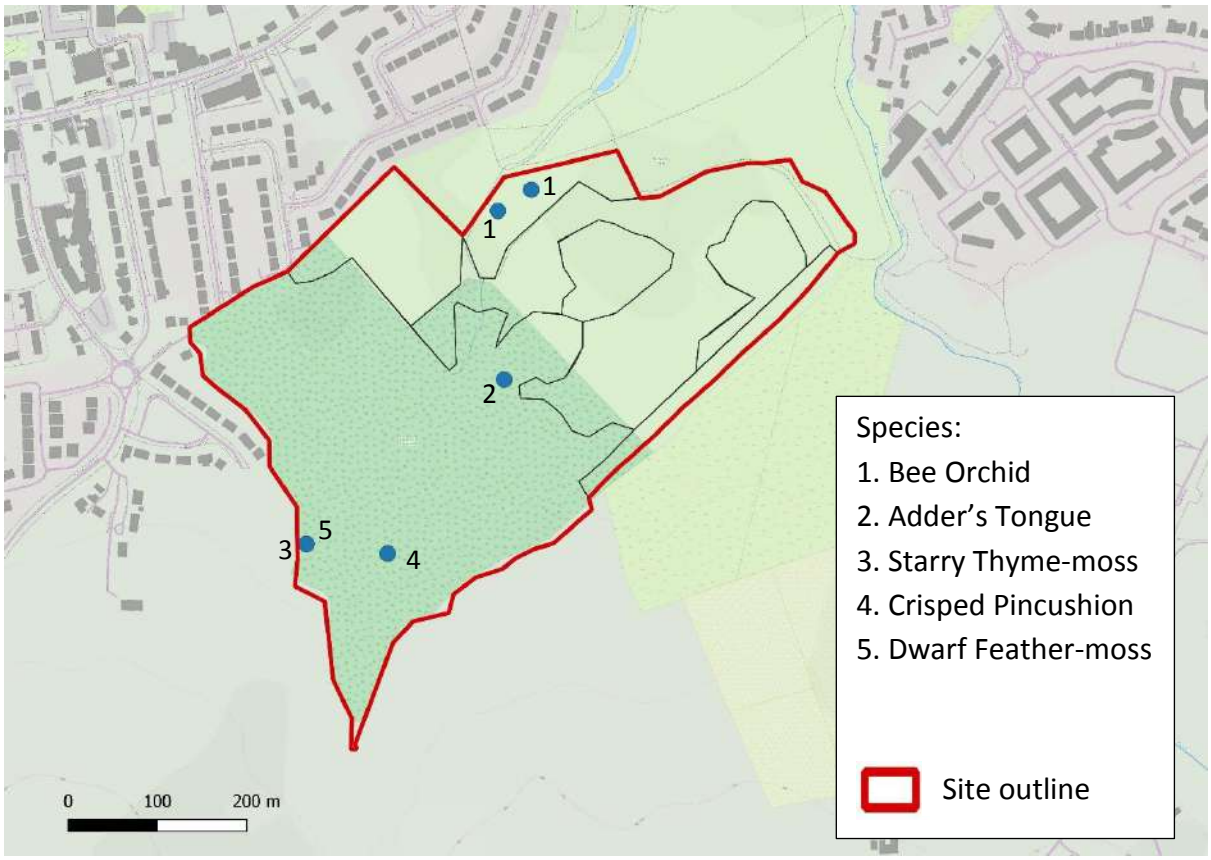
Table 3: List of notable species recorded at Rathcoole.

Latin name	English name	Grid reference	Habitat
Ophrys apifera	Bee Orchid	O0275626656	Meadow
Ophrys apifera	Bee Orchid	O0271826632	Meadow
Ophioglossum vulgatum	Adder's Tongue	O0272526439	Woodland
Mnium stellare	Starry Thyme-moss	O0249926251	Woodland
Ulota crispa s.s.	Frizzled Pincushion	O0259226240	Woodland
Oxyrhhynchium pumilum	Dwarf Feather-moss	O0249926251	Woodland

Although no threatened or protected species were found, a number of notable species were encountered (Table 3; Figure 4). A total of 17 flowering spikes of Bee Orchid (Photo A12) were counted at two locations in the area of flower-rich hay meadow, and Common Spotted Orchids were frequent in a number of places in the site. The diminutive fern Adder's Tongue (*Ophioglossum vulgatum*; Photo A13) was found on the floor of the wet woodland, with at

least 20 spikes growing over a ca. 3 x 3m area. This species has not previously been recorded in this area. A bryophyte (moss and liverwort) survey (Appendix 4) carried out in March 2021 recorded a total of 51 species, including one species, Crisped Pincushion (*Ulota crispa* s.s.) new for County Dublin, and several other species that are uncommon in County Dublin. This is a good number of species for a lowland site in the east of Ireland, and the majority of these species only occur here due to the presence of woodland habitat, which provides essential shade and humidity.

Figure 4: Location of notable species recorded at Rathcoole. Base map © OpenStreetMap contributors https://www.openstreetmap.org/copyright.



3.4 Threats and impacts noted

A number of threats and impacting activities were noted, that are currently impacting the habitats present, or may do so in the future. A number of invasive species were encountered, the most concerning of these being Japanese Knotweed (*Fallopia japonica*), which forms a small stand alongside scrub at the eastern end of the site. Within the woodland, most non-native species were found in the northwestern portion, with

Cotoneaster occasional in this area, alongside a number of saplings of non-native tree species including Sycamore and Beech (*Fagus sylvatica*). None of these non-native species are currently widespread or outcompeting native species, but in time it is likely that they will spread and become problematic. Another issue that is of detriment to the woods is littering resulting from anti-social behaviour and illicit drinking. This is particularly in evidence in the northwestern corner of the woods, where there is easy access to dense woodland from the end of a lane. Much of the grassland habitat is currently under threat from natural succession, as scrub encroachment is evident in all areas apart from the meadow adjacent to the park. Conversely, this is of benefit to the woodland, as it will lead to an expansion to the area of woodland over time.

4 Assessment of the importance of habitats present

Three habitats listed on Annex I of the EU Habitats Directive are present at Rathcoole. These are 91E0 Alluvial woodland, 6510 Lowland hay meadow and 7220 Petrifying springs. The most extensive of these is 91E0 Alluvial woodland, and this area should be considered as being of National/County conservation value, i.e. an important area of Annex habitat, that is outside a designated area (SAC or NHA), but contains a significant example of a habitat that is rare or declining nationally (NRA, 2009). 91E0 Alluvial woodland is estimated to cover an area of only 18 km^2 nationwide (O'Neill and Barron, 2013), and in the latest assessment of Annex I habitats under Article 17 of the EU Habitats Directive (NPWS, 2019), the overall status of 91E0 Alluvial woodland is assessed as Unfavourable-bad and Declining. There are currently no other areas of 91E0 Alluvial woodland habitat within the 10km square within which Rathcoole is located. Therefore, although the area of 91E0 Alluvial woodland at Rathcoole is young and still developing, it is of utmost importance to conserve it and maintain it in good condition, to counteract the loss and degradation of this habitat elsewhere across Ireland.

Similarly, although covering only a small area, the 6510 Lowland hay meadow habitat present must also be considered to be of National/County conservation value. Lowland hay meadows are restricted in distribution, primarily to the Shannon Callows and the west of Ireland, and 28% of the area of this habitat at monitoring sites was lost between 2013 and 2018, and the Structure and Functions of many other sites also became worse (Martin et al.,

2018), meaning that it is a highly threatened habitat in Ireland. Consequently, 6510 Lowland hay meadow was assessed under the latest Article 17 monitoring as Unfavourable-bad and Declining (NPWS, 2019). Therefore, all examples of this habitat must be considered as being of high conservation priority.

The example of 7220 Petrifying springs is of lower conservation value, as few positive indicator species are present and it does not contain large deposits of tufa, but is still of importance in a county context.

The remaining habitats, that do not correspond to Annex I habitats at present, are also of high conservation value, as they have been free from significant human disturbance for many years and are a vital refuge for many species of flora and fauna in a landscape highly modified by urbanisation and intensive agriculture. Furthermore, if managed correctly, these areas of habitat have the potential to become Annex habitat of high conservation importance in the short to medium term, although their value does not lie solely in their potential to become Annex habitat.

In a broader context, beyond its biodiversity value, this area of natural habitat serves a range of functions of direct benefit to local communities, acting as a protective forest (Gowran, 2020). Amongst other Ecosystems Services provided by this area, the most important role is that of hydrological regulation and a reduction in flooding in the catchment of the River Camac, into which this area drains, reducing the need for costly flood alleviation works (Bullock et al., 2016). Additionally, this area provides an important amenity and an opportunity for local residents to interact with nature, which has been shown to have many mental health benefits (Hardman, 2020).

5 Management recommendations

At present, most of this 24ha area of natural habitat exists without any direct human intervention, having developed by chance, with the exception of the managed area of meadow adjacent to Rathcoole Park. If left unmanaged into the future, it is likely to continue to be of high value to wildlife, but invasive species are likely to become dominant in time and diversity of habitats would not be maintained, so a degree of management is desirable. Also, measures should be taken to secure its future and its value and importance

should be officially recognised. The following measures are recommended to conserve and enhance the habitats across the entire area:

- This site should be designated as a proposed Natural Heritage Area (pNHA), which would recognise its locally important role on an official level. It could also be designated as a National Nature Reserve.
- The site, in its entirety, should be not be zoned for development, due to its high biodiversity and ecosystem services value, and all development plans for the site should be withdrawn. The site should be recognised in the County Development Plan as an important area of green infrastructure and a key integral part of the larger catchment of the Camac River.
- A protective buffer zone around the site should be maintained and any future developments should take into account any potential impacts on this site. Green corridors should be put in place to allow the safe passage of wildlife between this and other nearby areas of natural habitat.
- Although it would be desirable not to over-manage the site, and to maintain its current wild character, it can also be used as a vital educational resource, given its urban-edge location. An unobtrusive official path and nature trail could be developed around the site and information boards detailing the habitats and species present could be installed. It could also be used by school and university students to study easily accessible semi-natural habitats and investigate the process of natural succession and regeneration.
- Invasive species should be eradicated and controlled. At present, this would be a relatively simple task, as invasive species only occur as isolated plants in small areas, so could easily be removed, but over time, they will spread and the task of removing them will be much greater.
- The area of woodland should otherwise remain unmanaged and be allowed to develop to its full potential. Areas that are currently scrub and developing woodland should be allowed to develop into mature woodland. It should also be ensured that adjacent activities and developments do not alter the water table, which could have a knock-on effect on the composition and quality of the wet woodland habitat.

- The area of Lowland hay meadow should continue to be managed as it is at present, and the area of rough grassland should be managed similarly, with annual mowing. With time, this area may then become an area of flower-rich meadow, similar to the existing area, possibly corresponding to the Annex I habitat 6510 Lowland hay meadow.
- This area should at all times be considered as a continuous area of natural habitat, with greatest value and integrity when all areas are intact, regardless of whether or not they correspond to Annex I habitat under the EU Habitats Directive. The loss of any areas of the habitat present will diminish and damage the adjacent areas of habitat.
- A full assessment of the Ecosystem Services provided by this area, and their overall value to the local community and the wider area should be carried out and factored into any future plans for the area.

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6 Appendices

Appendix 1: Details of quadrats taken at four locations within the wet woodland area and one in an area of immature woodland/scrub, listing cover of all species in percentage and environmental variables, following the methodology of O'Neill and Barron (2013).

	Quadrat	**Woodland 1**	**Woodland 2**	**Woodland 3**	**Woodland 4**	**Immature Wood**
	Grid reference	O0272526439	O0245526481	O0263626241	O0258526449	O0300826560
	Size	20 x 20m	20 x 20m	20 x 20m	20 x 20m	5 x 5m
	Date	15/06/2021	15/06/2021	15/06/2021	18/06/2021	18/06/2021
	Surveyor	Rory Hodd	Rory Hodd	Rory Hodd	Rory Hodd	Rory Hodd
	Bare soil	0	3	0	0	3
	Bare rock	0	0	0	0	0.1
	Litter	75	20	70	80	75
	Dead wood	3	0	0	0.5	0
	Surface water	0	0	0	0	0
	Ground layer	10	10	20	25	1
	Field layer	25	80	35	10	85
	Shrub layer	10	15	5	10	80
	Canopy	90	85	95	85	10
	Number of species	32	35	20	24	21
Species:						
Fraxinus excelsior	Ash		0.3			0.3
Salix caprea	Goat Willow	5	5	5	15	
Salix cinerea	Grey Willow	90	70	90	70	80
Agrostis stolonifera	Creeping Bent	20	20	5	0.5	
Angelica sylvestris	Wild Angelica		0.5			
Betula pubescens	Downy Birch	3	15		3	
Crataegus monogyna	Hawthorn	1	0.3	1		
Filipendula ulmaria	Meadowsweet	0.3				
Ranunculus repens	Creeping Buttercup	0.3			0.5	10
Rumex sanguineus	Wood Dock			0.1	0.1	
Solanum dulcamara	Bittersweet	0.1		0.1		
Urtica dioica	Common Nettle	1		10	10	
Abies grandis	Giant Fir		0.1			
Acer pseudoplatanus	Sycamore		0.3			
Alopecurus pratensis	Meadow Foxtail					0.5
Anthoxanthum odoratum	Sweet Vernal-grass					1
Asplenium scolopendrium	Hart's-tongue				0.1	
Atrichum undulatum	Common Smoothcap				5	
Brachythecium rutabulum	Rough-stalked Feathermoss	0.3	0.1			0.3

	Quadrat	Woodland 1	Woodland 2	Woodland 3	Woodland 4	Immature Wood
Carex pendula	Pendulous Sedge		0.1			
Chamerion angustifolium	Rosebay Willowherb	5		20	0.5	
Cirsium palustre	Marsh Thistle	0.1				
Cirsium vulgare	Spear Thistle			0.1	0.1	
Cotoneaster sp.	Cotoneaster		0.5			
Crepis capillaris	Smooth Hawk's-beard					0.3
Cynosurus cristatus	Crested Dog's-tail					1
Dactylorhiza fuchsii	Common Spotted-orchid	0.1	0.1			
Dryopteris dilatata	Broad Buckler-fern		0.1			
Dryopteris filix-mas	Male-fern				0.1	
Epilobium montanum	Broad-leaved Willowherb	0.3	0.1	0.3	1	
Equisetum palustre	Marsh Horsetail	0.1		0.1	0.1	
Festuca rubra	Red Fescue					3
Galium aparine	Cleavers	0.1	0.1			0.1
Geranium robertianum	Herb-Robert		3			
Geum urbanum	Wood Avens	0.3				
Hedera hibernica	Atlantic Ivy	0.3	60		0.1	
Heracleum sphondylium	Hogweed	3	0.1			
Holcus lanatus	Yorkshire-fog		1	0.3	0.5	30
Juncus inflexus	Hard Rush	0.1	0.5			0.5
Kindbergia praelonga	Common Feathermoss	10	1	15	25	1
Lapsana communis	Nipplewort			0.1		
Lonicera periclymenum	Honeysuckle		0.1			
Ophioglossum vulgatum	Adder's-tongue	0.1				
Plagiomnium undulatum	Palm-tree Moss	0.1	7		1	
Plantago lanceolata	Ribwort Plantain					0.5
Poa trivialis	Rough Meadow-grass					40
Polystichum setiferum	Soft Shield-fern				0.1	
Primula x polyantha	Primrose		0.3			
Prunus avium	Wild Cherry		0.1			
Prunus spinosa	Blackthorn	0.5	0.1			
Quercus petraea	Sessile Oak					0.1
Ranunculus acris	Meadow Buttercup		0.3	0.1		
Ribes nigrum	Black Currant		0.1			
Rubus fruticosus agg.	Bramble	10	15	3	5	1
Rumex acetosa	Common Sorrel	0.1				0.5
Sambucus nigra	Elder	1		1	0.3	
Senecio jacobea	Common Ragwort	0.1	0.1	0.1	0.1	

	Quadrat	Woodland 1	Woodland 2	Woodland 3	Woodland 4	Immature Wood
Sorbus aucuparia	Rowan		0.1			
Stachys palustris	Marsh Woundwort	0.1	0.1			1
Taraxacum officinale agg.	Dandelion	0.1	0.3	0.1	0.1	5
Thuidium tamariscinum	Common Tamarisk-moss			5		
Tilia x europaea	Silver Lime		0.1			
Veronica montana	Wood Speedwell	0.1				
Veronica serpyllifolia	Thyme-leaved Speedwell				0.1	
Vicia sepium	Bush Vetch	0.1				0.1

Appendix 2: Results of the condition assessment of the four plots taken within Annex 91E0 Alluvial woodland habitat, see O'Neill and Barron (2013) for further details of the methodology.

	Woodland 1	Woodland 2	Woodland 3	Woodland 4
Target species:				
Fraxinus excelsior		x		
Salix cinerea	x	x	x	x
Salix caprea	x	x	x	x
Other positive indicators:				
Betula pubescens	x	x		x
Crataegus monogyna	x	x	x	
Solanum dulcamara	x		x	
Agrostis stolonifera	x	x	x	x
Angelica sylvestris		x		
Filipendula ulmaria	x			
Ranunculus repens	x			x
Rumex sanguineus			x	x
Urtica dioica	x		x	x
Total indicators	9	7	7	7
Negative indicators:				
Acer pseudoplatanus		x		
Cotoneaster sp.		x		
Structure:				
Median canopy height (m)	6	8	7	7
Total canopy cover (%)	90	85	95	85
Cover of target species (%)	90	75	95	85
Cover of negative species (%)	0	1	0	0
Native shrub layer cover (%)	10	25	5	10
Field layer cover (%)	25	80	35	10
Field layer height (cm)	50	30	60	50
Bryophyte layer cover (%)	10	10	15	25
Grazing evidence:				
Topiary effect	N	N	N	N
Browse line	N	N	N	N
Abundant dung	N	N	N	N
Bark stripping	N	N	N	N
Trampling	N	N	N	N

Tally saplings (>2m) of target spp:				
Salix cinerea				15
Tally saplings (>2m) of other native spp:				
Betula pubescens		6		1
Crataegus monogyna	1		3	
Prunus avium		1		
Sorbus aucuparia		1		
DBH of target species by size class:				
Salix cinerea - small	30	20	30	20
Salix cinerea - medium				2
Salix caprea - medium	1	1		1
Salix caprea - large		1	1	

Appendix 3: List of positive indicator species of 6510 Lowland hay meadow recorded in meadow area at Rathcoole.

Latin name	English name	High quality indicator	Inside plot
Leucanthemum vulgare	Ox-eye Daisy	Y	
Rhinanthus minor	Yellow Rattle	Y	
Ophrys apifera	Bee Orchid	Y	Y
Dactylorhiza fuchsii	Common Spotted Orchid	Y	Y
Alopecurus pratensis	Meadow Foxtail		Y
Centaurea nigra	Knapweed		
Crepis capillaris	Hawk's-beard		Y
Heracleum sphnodylium	Common Hogweed		
Hypochaeris radicata	Cat's-ear		Y
Plantago lanceolata	Ribwort Plantain		Y
Ranunculus acris	Meadow Buttercup		Y
Trifolium pratense	Red Clover		Y

Appendix 4: List of bryophyte (moss and liverwort) species recorded from Rathcoole in March 2021.

Latin name	English name	Type	Habitat
Amblystegium serpens	Creeping Feathermoss	Moss	Trees and soil
Atrichum undulatum	Common Smoothcap	Moss	Soil
Barbula convoluta var. *sardoa*	Sardinian Bird's-claw Beardmoss	Moss	Rock
Brachythecium rivulare	River Feathermoss	Moss	Spring
Brachythecium rutabulum	Rough-stalked Feathermoss	Moss	Trees and soil
Bryum capillare	Capillary Threadmoss	Moss	Rock
Bryum dichotomum	Bicoloured Bryum	Moss	Rusty car
Calliergonella cuspidata	Pointed Spearmoss	Moss	Spring
Cratoneuron filicinum	Fern-leaved Hookmoss	Moss	Spring
Cryphaea heteromalla	Lateral Cryphaea	Moss	Trees
Didymodon insulanus	Cylindric Beardmoss	Moss	Concrete
Fissidens bryoides var. *bryoides*	Lesser Pocketmoss	Moss	Soil bank
Fissidens taxifolius	Common Pocketmoss	Moss	Streamside
Frullania dilatata	Dilated Scalewort	Liverwort	Trees
Funaria hygrometrica	Bonfire Moss	Moss	Bonfire site
Grimmia pulvinata	Grey-cushioned Grimmia	Moss	Rock
Homalothecium sericeum	Silky Wall Feathermoss	Moss	Rock
Hypnum cupressiforme var. *cupressiforme*	Cypress-leaved Plaitmoss	Moss	Trees
Hypnum cupressiforme var. *resupinatum*	Supine Plaitmoss	Moss	Trees
Isothecium myosuroides var. *myosuroides*	Slender Mouse-tail Moss	Moss	Trees
Kindbergia praelonga	Common Feathermoss	Moss	Soil
Leiocolea turbinata	Top Notchwort	Liverwort	Soil bank
Lophocolea bidentata	Bifid Crestwort	Liverwort	Soil
Lunularia cruciata	Cresent-cup Liverwort	Liverwort	Streamside
Metzgeria furcata	Forked Veilwort	Liverwort	Trees
Metzgeria violacea	Blueish Veilwort	Liverwort	Trees
Mnium stellare	Starry Thyme-moss	Moss	Soil bank
Neckera complanata	Flat Neckera	Moss	Trees
Orthotrichum affine	Wood Bristlemoss	Moss	Trees
Orthotrichum anomalum	Anomalous Bristlemoss	Moss	Rock
Orthotrichum lyellii	Lyell's Bristlemoss	Moss	Trees
Orthotrichum pulchellum	Elegant Bristlemoss	Moss	Trees
Orthotrichum tenellum	Slender Bristlemoss	Moss	Trees
Oxyrrhynchium hians	Swartz's Feathermoss	Moss	Soil
Oxyrrhynchium pumilum	Dwarf Feathermoss	Moss	Soil bank
Pellia endiviifolia	Endive Pellia	Liverwort	Streamside
Plagiochila asplenioides	Greater Featherwort	Liverwort	Soil
Plagiomnium rostratum	Long-beaked Thyme-moss	Moss	Soil
Plagiomnium undulatum	Palm-tree Moss	Moss	Soil
Polytrichum commune	Common Haircap	Moss	Damp ground
Radula complanata	Even Scalewort	Liverwort	Trees
Rhynchostegium confertum	Clustered Feathermoss	Moss	Rock

Rhytidiadelphus squarrosus	Springy Turf-moss	Moss	Grassland
Schistidium crassipilum	Thickpoint Grimmia	Moss	Concrete
Thamnobryum alopecurum	Fox-tail Feathermoss	Moss	Streamside
Thuidium tamariscinum	Common Tamarisk-moss	Moss	Soil
Tortella tortuosa	Frizzled Crisp-moss	Moss	Rock
Tortula muralis	Wall Screw-moss	Moss	Concrete
Ulota bruchii	Bruch's Pincushion	Moss	Trees
Ulota crispa s.s.	Crisped Pincushion	Moss	Trees
Ulota phyllantha	Frizzled Pincushion	Moss	Trees

Appendix 5: Photographs of habitats and species.

Photo A1: View of quadrat and assessment plot number one in the 91E0 Alluvial woodland area.

Photo A2: View of quadrat and assessment plot number two in the 91E0 Alluvial woodland area.

Photo A3: View of quadrat and assessment plot number three in the 91E0 Alluvial woodland area.

Photo A4: View of quadrat and assessment plot number four in the 91E0 Alluvial woodland area.

Photo A5: Area of rank meadow, which could become flower-rich with targeted management.

Photo A6: Strip of species-rich wet grassland along the southern boundary of the site.

Photo A7: View of area of species-rich 6150 Lowland hay meadow.

Photo A8: View of location where a condition assessment was undertaken of the 6150 Lowland hay meadow habitat.

Photo A9: Immature woodland and scrub developing in area of rank grassland.

Photo A10: Ground flora of immature woodland, where quadrat was recorded, which is transitional between grassland and woodland.

Photo A11: Spring in woodland, corresponding to Annex habitat 7220 Petrifying springs, in which tufa deposits are forming.

Photo A12: Bee Orchid (*Ophrys apifera*) growing in 6510 Lowland hay meadow.

Photo A13: Adder's Tongue (*Ophioglossum vulgatum*) growing on the floor of wet woodland.

Photo A14: Common Spotted Orchid (*Dactylorhiza fuchsii*) growing in orchid-rich wet grassland area.

Appendix 6: Results of a survey of wet woodland area by Daly (2020), included with permission of Orla Daly. (On next page)

11a Poddle Park,
Kimmage,
Dublin 12
D12 AX76

Re: SDCC Draft Development Plan Submission

Rathcoole Woodlands (EU Priority Annex I habitat) – SDCC zoned RES-N lands

Dear Sir/ Madame,

I am a professional ecologist that recently conducted a survey of Rathcoole woodlands.

My findings conclude that habitat within the site corresponds to the **'Priority Annex I habitat to 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*'** as listed under the **EU Habitats Directive**. This will have implications for developments within and adjacent to the woodland.

Below I will submit a brief report of my survey of Rathcoole woodlands with the methodology, analyses conducted, results and discussion presented.

Kind regards,

Orla Daly

Figure 1. Image from the Romeville's Planning Application that depicts development on the Rathcoole woodland site (EU Priority Annex I habitat).

Rathcoole woodland survey

1. Survey aims

Previous surveys of Rathcoole woodland by Mac Diarmada & Associates (2020) classified the site according to the Fossitt (2000) habitat classification scheme. Habitats recorded comprised:

- WN6 Wet willow-alder-ash woodland
- WS2 Immature woodland
- WS1 Scrub

The presence of WN6 Wet willow-alder-ash woodland warranted investigation as to whether the habitat corresponded to the **'Priority Annex I habitat to 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*'** as listed under the **EU Habitats Directive**. Priority habitats are those deemed to be in danger of disappearance, in view of the proportion of their natural range within the EU.

2. Field survey

A field survey was conducted on the 23rd August 2020. Four plots (20 m x 20 m) were conducted within the woodland. Plot placement aimed to capture habitat variability while also ensuring wide geographic spread. While it was beyond the scope of this survey to record full relevés; the main plants within each plot - in the canopy, understorey, field layer and bryophyte layer - were recorded with percentage (%) scores given to each species.

Absence/ presence of positive indicator species for the Priority Annex I habitat 91E0 as listed in the national monitoring methodology for this Annex I habitat type were also noted (Table 2) (O'Neill & Barron, 2013).

Figure 1. Plot locations with boundary of the recent Romeville's Planning Application development displayed. The area occupied by the woodland has also been zoned.

3. Analyses

ERICA Tool

Plot data comprising the species lists with % scores were then run through the ERICA Tool (Engine for Relevés to Irish Communities Assignment) (Perrin, 2016). ERICA is a web application that assigns vegetation data to the communities of the Irish Vegetation Classification (IVC). The results were then checked for affinities to the Priority Annex I habitat 91E0.

91E0 Positive Indicator Species

The presence/ absence of positive indicator species for the Priority Annex I habitat 91E0 were tallied for each plot. They were then compared against the target threshold value as outlined in the national monitoring methodology for this Annex I habitat type (i.e. ≥ 6 positive indicator species is considered optimal for this particular criterion of the 91E0 assessment) (O'Neill & Barron, 2013).

Table 1. List of positive indicator species for 91E0 woodland.

91E0 Positive Indicator Species
Target species:
Alnus glutinosa
Fraxinus excelsior
Salix spp. (all species)
Other woody species:
Betula pubescens
Crataegus monogyna
Solanum dulcamara
Viburnum opulus
Herbs & Ferns:
Agrostis stolonifera
Angelica sylvestris
Carex remota
Filipendula ulmaria
Galium palustre
Iris pseudacorus
Lycopus europaeus
Mentha aquatica
Phalaris arundinacea
Ranunculus repens
Rumex sanguineus
Urtica dioica
Mosses & Liverworts:
Calliergonella cuspidata
Climacium dendroides
Thamnobryum alopecurum

4. Results

Vegetation communities

Three plots (75%) were found to correspond to the IVC Community **WL3D Grey Willow – Common Nettle woodland;** a community with affinities to the EU Annex I priority habitat 91E0 (57.6%) (https://www.biodiversityireland.ie/projects/national-vegetation-database/irish-vegetation-classification/explore/wl3d/).

The fourth plot (25%) was found to correspond to the IVC Community **WL4D Downy Birch – Bramble woodland,** a community with lower affinities to the Priority Annex I habitat 91E0 (9.5%). (https://www.biodiversityireland.ie/wordpress/wp-content/uploads/WL4D.pdf) (Table 2).

Table 2. Results of ERICA analysis on the four plots

PLOT	NUMBER OF PLANTS SCORED	CODE	IVC COMMUNITIES	DIVISION	TYPE
1	16	WL3D	Grey Willow – Common Nettle woodland	Woodland	Assigned
2	16	WL3D	Grey Willow – Common Nettle woodland	Woodland	Assigned
3	17	WL3D	Grey Willow – Common Nettle woodland	Woodland	Transitional
4	15	WL4D	Downy Birch – Bramble woodland	Woodland	Assigned

Presence/ absence of positive indicator species

All four plots conducted had ≥ 6 positive indicator species for the Priority Annex I habitat 91E0 present within them (range = 6-8; Table 3). Other positive indictors species noted at the site (but located outside the plots) comprise *Filipendula ulmaria* and *Iris pseudacorus*.

Table 3. Positive indicator species for 91E0 within each plot.

91E0 Positive Indicator Species	Plot 1	Plot 2	Plot 3	Plot 4
Target species:				
Alnus glutinosa				✓
Fraxinus excelsior	✓	✓	✓	✓
Salix cinerea			✓	
Salix caprea				
Other woody species:				
Betula pubescens		✓	✓	✓
Crataegus monogyna	✓	✓	✓	✓
Solanum dulcamara	✓	✓		✓
Viburnum opulus				
Herbs & Ferns:				
Agrostis stolonifera	✓	✓	✓	✓
Angelica sylvestris		✓		
Carex remota				
Filipendula ulmaria				
Galium palustre				
Iris pseudacorus				
Lycopus europaeus				
Mentha aquatica				
Phalaris arundinacea	✓			
Ranunculus repens	✓		✓	✓
Rumex sanguineus				
Urtica dioica	✓			
Mosses & Liverworts:				
Calliergonella cuspidata	✓			
Climacium dendroides				
Thamnobryum alopecurum				
Total number	**8**	**6**	**6**	**7**

5. Discussion

This study has demonstrated that habitat present in Rathcoole woodland corresponds to the Priority Annex I habitat 91E0. The canopy is dominated by the target 91E0 positive indicator tree - Grey willow - numerous other positive indicator species are present within the canopy, understorey and field layer. A range of 6-8 positive indicator species were recorded per 20m x 20m plot; with this number considered optimal according to the national monitoring methodology for this Annex I habitat type (O'Neill & Barron, 2013). Rathcoole woodland is still in an early successional phase having developed on open habitat within the last twenty years. Previous woodland succession studies (Daly *et al.*, 2019) have shown that as young woodland develops:

- ruderal or weedy species more typical of open habitats decrease,
- trees gradually self-thin due to competition,
- this in turn allows more light to reach the woodland floor which encourages field layer development

The national status of this Priority Annex I habitat is **'Unfavourable-Bad'** (NPWS, 2019; Table 4). Within the Republic of Ireland, the current area of this Annex I habitat is considered insufficient to ensure long-term viability (i.e. more than 10% below the Favourable Reference Area). Preventing further loss and degradation of this Annex I habitat and its associated ecosystem functions is therefore imperative.

This Priority Annex I habitat is a water dependant habitat; therefore, any activity (within or adjacent to the site) that alters site hydrology could negatively impact the woodland (e.g. species composition change). The presence of this Priority Annex I habitat has implications for any future developments within or adjacent to the Rathcoole woodland site (e.g. SDCC zoned RES-N lands).

Table 4. National Conservation Status Assessment for the Annex I habitat 91E0. Adapted from NPWS (2019).

Parameter	Justification for assessment	National Assessment
Range	Stable, no recorded loss; approximately equal to Favourable Reference Range.	**Favourable**
Area	Decreasing due to anthropogenic loss; current area is more than 10% below the Favourable Reference Area.	**Unfavourable-Bad**
Structure and Functions	Decreasing, evidence of decline in condition since the last monitoring survey; 15.2% of the habitat is in Unfavourable condition.	**Unfavourable-Inadequate**
Future prospects	Pressures and threats including non-native invasive species, problematic native species and disease are causing deterioration in habitat quality. Area parameter threatened by woodland clearance.	**Unfavourable-Bad**
Overall CS	Combining individual parameter results according to the evaluation matrix in Table 2.	**Unfavourable-Bad**

Plate 1. Plot 1

Plate 2. Plot 2

Plate 3. Plot 3

Plate 4. Plot 4

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Additional information online regarding the habitats present at the site:

- WN6 Wet willow alder-ash woodland https://drive.google.com/file/d/1PrIkL1MO-wdfXtv97XBY4T9sx9oMYCmG/view?fbclid=IwAR2TBuJIFUxAWDKnro3FYHuLkrRjCTMzTJfVviaZn-BuKDINXnp0oE0WMo4
- WS2 Immature Woodland https://drive.google.com/file/d/1_jzygqrz63u62lOZwyx2jaTlPnJjy7Hb/view?fbclid=IwAR3BjXETYbWTFKZoFhSB2fHiqc4_y4m8D8qlBUA3ftBwZBPXJHEg8zn5UKI)
- WS1 Scrub https://drive.google.com/file/d/1MUqLVdK-DPMpvPD2kwwyzHnONnsb3tI2/view?usp=sharing