

# **Environmental Impact Assessment Report (EIAR)**

## **Volume 6 of 6: Appendices**

### **(Appendix 8.8) Bryophyte Survey Report**

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**BRYOPHYTE SURVEYS:  
PARTEEN BASIN AND BIRDHILL, CO. TIPPERARY**

**December 2020**



*Parteen Basin woodland*

**Report produced by Denyer Ecology for:  
TOBIN Consulting Engineers**

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## 1 INTRODUCTION

### 1.1 Background

Denyer Ecology was commissioned by TOBIN Consulting Engineers to undertake a bryophyte survey of two sites in Co. Tipperary: Site 1: Raw Water Intake and Pumping Station (at Parteen Basin) and Site 2: Water Treatment Plant (at Birdhill). There were no historic bryophyte records from either of the two sites and their potential to support a bryophyte flora of conservation interest was unknown.

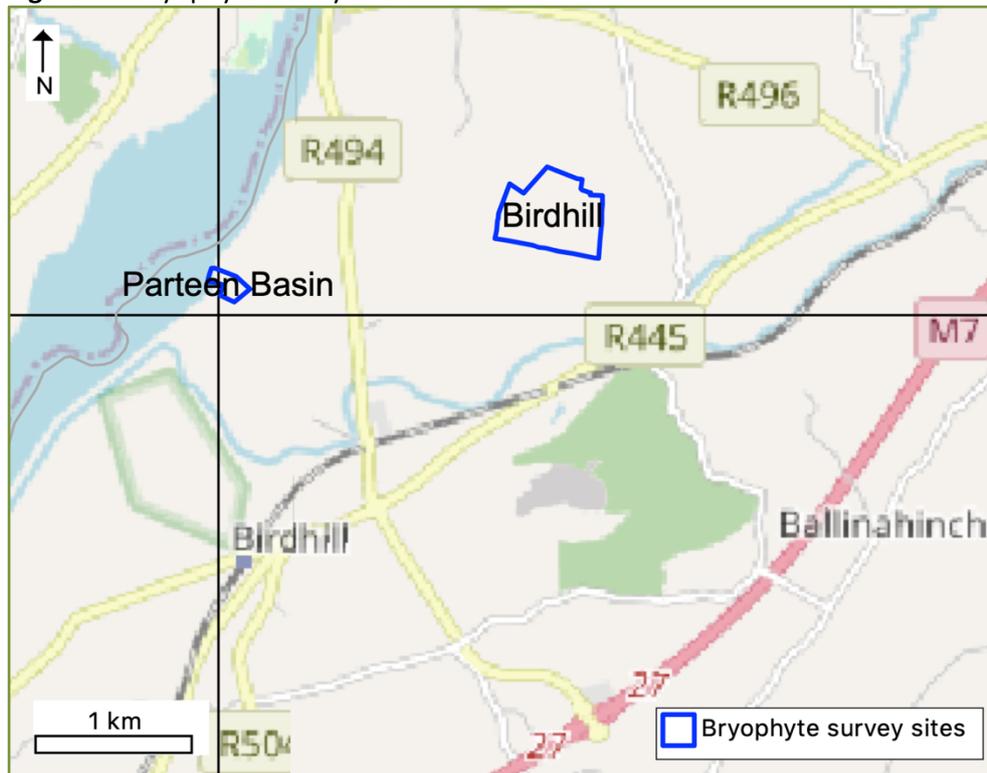
### 1.2 Aims

The aim of the survey was to undertake a bryophyte survey of all accessible areas of the two sites to determine whether the sites supports/ have the potential to support any bryophytes of conservation interest. This included aquatic, terrestrial, epiphytic and saxicolous bryophyte species.

### 1.3 Sites

The site locations are shown in Figure 1.1. At the Raw Water Intake and Pumping Station site, the site comprises an area of mixed broadleaved woodland and conifer plantation on the edge of the reservoir. The reservoir shoreline was included in the survey area. At the Water Treatment Plant site, the site comprises a number of grazed wet grassland fields with hedgerows between the fields.

Figure 1.1 Bryophyte survey site locations



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## 2 METHODOLOGY

### 2.1 Desktop information

The following resources were consulted:

- GIS boundaries of designated site data (data accessed via NPWS website).
- Aerial photography (Bing maps).
- British Bryological Society Atlas of British and Irish bryophytes (Blockeel et al., 2014a & 2014b).
- British Bryological Society Atlas dataset

## 2.2 Bryophyte survey

The two sites were surveyed by an experienced bryologist in October 2020. The site survey areas are shown on Figures 2.1 and 2.2. All accessible areas of the site that were considered of potential interest for bryophytes were surveyed. The focus was on habitats of potential interest for bryophytes, such as the reservoir edge, ditches, epiphytes, mature trees, stonework and wet grassland. All bryophytes encountered in the field were recorded on a recording card, with additional information such location notes, habitat photos, GPS location and abundance recorded where relevant.

**Figure 2.1** Raw Water Intake and Pumping Station site survey area (red line)



RGB Aerial Photography - © Bluesky Geospatial Limited

**Figure 2.2** Water Treatment Plant site survey area (red line)



RGB Aerial Photography - © Bluesky Geospatial Limited

### 2.3 Identification of specimens

Any specimens that could not be identified in the field, or required confirmation, were collected and examined using a microscope. In the case of some liverwort species, it was essential to examine the specimen as soon as possible, before drying out occurred, as positive identification relies on features of oil bodies in the cells, which are lost upon drying. Where relevant, specimens were sent to the British Bryological Society referees for verification.

### 2.4 Ecological evaluation

The rarity (local and national) and legal protection of the bryophytes recorded from the site were assessed using a number of resources:

- Flora (Protection) Order, 2015
- Ireland Red List No. 8. Bryophytes: Mosses, Liverworts & Hornworts (Lockhart et al., 2012a)
- British Bryological Society Atlas of British and Irish bryophytes (Blockeel et al., 2014a & 2014b).
- British Bryological Society Atlas dataset

### 2.5 Plant species nomenclature

The bryophyte nomenclature adopted by Blockeel et al. (2014a & b) is used; this is based on the *Checklist of British and Irish bryophytes* (Hill et al., 2009) with minor modifications to reflect recent taxonomic changes. Note that a new checklist is due to be published in early 2021 and some of the names included in this report will be changed.

### 2.6 Limitations

- At the Raw Water Intake and Pumping Station site there were no access limitations.
- At Water Treatment Plant site there were cattle in several fields which reduced the amount of time spent in these fields (for Health and Safety reasons). However, it is considered that all

areas of potential bryophyte rich habitat were surveyed, and this does not limit the survey findings.

### 3 SURVEY RESULTS AND DISCUSSION

#### 3.1 Raw Water Intake and Pumping Station site

Details of all bryophyte species recorded at the Raw Water Intake and Pumping Station site, their abundance at the site and local and national rarity are included in Annex A.

##### 3.1.1 Bryophyte habitats

The main bryophyte habitats present at the site are:

- Reservoir edge (exposed soil, boulders and trees) (e.g., Photograph 3.1). Bryophyte cover relatively low in these areas.
- Mixed broadleaved woodland (with Hazel) ground flora (e.g., Photograph 3.2). Abundant bryophyte growth in most of this area.
- Bryophytes growing on trunks and branches (epiphytes), mainly confined to mixed broadleaved woodland (e.g., Photograph 3.3).
- Bryophytes on fallen and rotting logs, mainly confined to mixed broadleaved woodland (e.g., Photograph 3.4).
- Banks and ditches within the woodland (mainly the mixed broadleaved woodland). These provide areas of exposed soil (slightly more acid than the calcareous soil on the woodland floor), shaded habitats and damp soil (e.g., Photograph 3.5).
- Boulders within mixed broadleaved and conifer woodland. The oceanic liverwort *Lophocolea fragrans* was locally frequent on several boulders and indicates high humidity levels with the woodland (e.g., Photograph 3.6).
- The ground flora in the conifer woodland. This provides acid soil habitat but had little bryophyte cover due to dense planting and high shading (e.g., Photograph 3.7).

##### 3.1.2 Bryophyte species

There were no previous bryophyte records for this site or local vicinity. A total of 69 bryophytes were recorded during the survey: 50 mosses and 19 liverworts (Annex A). This is a moderate species diversity for a small lowland site in the west of the country. The majority of the species recorded are from the area of broadleaved woodland and the area of conifer plantation had limited species diversity and bryophyte abundance.

There were no species that were new to the county and no rare/ protected species recorded during the survey. Seven of the species recorded have less than ten historic records in North Co. Tipperary (*Calypogeia arguta*, *Lejeunea cavifolia*, *Lophocolea fragrans*, *Brachythecium rivulare*, *Hygrohypnum luridum*, *Orthotrichum lyellii* and *Ulota calvescens*. North Co. Tipperary (Vice County H10) has a moderately diverse bryophyte flora with 393 taxa recorded. However, given that the county has both lowland and upland habitats and has a relatively western distribution within Ireland, this is not highly species rich. The county has reasonable recording coverage with just under 3000 bryophyte records up to 2014 (BBS Atlas dataset, 2014) and over 2000 of these post-2000 records. However, it is likely that the county is still under-recorded in some areas and this means that species which are relatively widespread and common in Ireland, can appear rare within the county (e.g., *Brachythecium rivulare*, *Calypogeia arguta* and *Orthotrichum lyellii*) (Annex A). At the Raw Water Intake and Pumping Station site, none of the locally 'rare' or 'occasional' species are genuinely rare species. Very few species typical of humid western woodland were recorded, with *Drepanolejeunea hamatifolia*, *Lophocolea fragrans*, *Ulota calvescens* the most 'western' or 'oceanic' species recorded. This is surprising given the location adjacent to a waterbody and with locally wet areas within the woodland. However, this area of woodland may be relatively recent in origin and has been disturbed by conifer planting. Bryophyte abundance is high in the mixed broadleaved woodland area, both growing epiphytically and on the woodland floor, but this tends to be dominated by a few species. There was some silt on

the trees at the edge of the reservoir, but no specialist 'silt' bryophytes were recorded from this zone. The water level of the reservoir reached the shoreline, and it is not clear if there are drawdown periods with exposed mud. Such areas have the potential to support a specialised and often rare bryophyte flora but there were no signs of this during the survey.

### 3.1.3 Photographs

#### Photographs 3.1-3.7 Raw Water Intake and Pumping Station site bryophyte habitat examples

Photograph 3.1. Reservoir edge bryophyte habitats. View to north. *Pellia endiviifolia* is occasional on exposed soil on the riverbank and *Fontinalis antipyretica* and *Hygrohypnum luridum* are occasional on stone/ boulders in the water.



Photograph 3.2. Bryophytes on ground and branches in mixed broadleaved woodland.



Photograph 3.3. Bryophytes growing on branches in mixed broadleaved woodland. Main species in photo is *Thamnobryum alopecurum* growing with *Hypnum cupressiforme*, *H. resupinatum* and *Metzgeria furcata*.



Photograph 3.4. Bryophytes growing on fallen, rotting logs in mixed broadleaved woodland. Typical species include *Lophocolea bidentata*, *Eurhynchium striatum* and *Hypnum cupressiforme* with occasional *Lejeunea cavifolia*.



Photograph 3.5. Large bank and ditch within mixed broadleaved woodland. This provides habitat for species such as *Calypogeia arguta*, *Plagiochila asplenioides*, *P. porelloides*, *Mnium hornum* and *Brachythecium rivulare* which were rare/ infrequent elsewhere in the site. *Thamnobryum alopecurum* and *Eurhynchium striatum* are dominant on the bank.



Photograph 3.6. Boulder on boundary between mixed broadleaved woodland and conifer plantation. *Lophocolea fragrans* (red arrow) locally frequent on these boulders, indicating high humidity levels in the woodland.



Photograph 3.7. Conifer plantation with little bryophyte cover on ground or trees.



### 3.2 Water Treatment Plant site

Details of all bryophyte species recorded at the Water Treatment Plant site, their abundance at the site and local and national rarity are given in Annex B.

#### 3.2.1 Bryophyte habitats

The main bryophyte habitats present at the site are:

- Branches and trunks of hedgerow trees and shrubs (epiphytes) (e.g., Photographs 3.1 and 3.2)
- Hedgerow banks (e.g., Photograph 3.3)
- Wet hedgerow ditches and associated humid soil on banks (e.g., Photograph 3.4)
- Wet grassland (e.g., Photographs 3.5 to 3.6). The wet grassland in the south of the site, to the north of the conifer plantation has higher species diversity than the grassland in the north.
- Stonework of old building (e.g., Photograph 3.7)

#### 3.2.2 Bryophyte species

There were no previous bryophyte records for this site or local vicinity. A total of 50 bryophytes were recorded during the survey: 41 mosses and 9 liverworts (Annex B). This is a moderate species diversity for a small lowland grassland site in the west of the country. The majority of the species recorded are from the hedgerows and associated banks and ditches and most of the grassland was relatively species-poor.

There were no species that were new to the county and no rare/ protected species recorded during the survey. Four of the species recorded have less than ten historic records in North Co. Tipperary (*Calypogeia arguta*, *Colura calyptrifolia*, *Homalia trichomanoides* and *Orthotrichum lyellii*). As discussed in Section 3.1.2, it is likely that the North Co. Tipperary (VC H10) is under-recorded for bryophytes in some areas. This means that species which are relatively widespread and common in Ireland, can appear rare within the county. At the , none of the locally 'rare' or 'occasional' species recorded are genuinely rare species. Bryophyte species diversity and abundance was highest in the south of the site (epiphytes, species within hedgerow and wet grassland). The grassland and hedgerows in the north had much lower species diversity. There appeared to be some springs with iron staining in the NE field, but there were no associated spring bryophytes.

#### 3.2.3 Photographs

**Photographs 3.1-3.7** Water Treatment Plant site bryophyte habitat examples

Photograph 3.1. Epiphytes are locally frequent in the hedgerows in the south of the site (view to N from SE corner of site).



Photograph 3.2. The northern hedgerows tend to have lower epiphyte diversity and abundance, particularly the gorse hedgerow on the northern border pictured here.



Photograph 3.3. Bryophytes are locally abundant on soil on hedgerow banks. These support species not found in the grassland or growing epiphytically, such as *Dicranella heteromalla*, *D. varia*, *Eurhynchium striatum*, *Fissidens* species, *Pogonatum aloides*, *Thamnobryum alopecurum* and *Thuidium tamariscinum*.



Photograph 3.4. Hedgerow ditch with associated stream in SW of site. This supports species not found elsewhere on the site such as *Homalia trichomanoides* and *Hookeria lucens*.



Photograph 3.5. Wet grassland in the south of the site (red arrow), to the north of the conifer plantation, supports a number of bryophytes of wet ground such as *Calliergonella cuspidata*, *Polytrichum commune*, *Pellia epiphylla* and *Riccardia chamedryfolia*.



Photograph 3.6. Wet grassland in the north of the site has lower species richness with occasional bryophytes such as *Calliergonella cuspidata* and none of the acid wetland species found in the south of the site.



Photograph 3.7. Old stone building in the centre of the site supports a few common species such as *Barbula sardoa*, *Barbula unguiculata*, *Bryum capillare* and *Tortula muralis*, not found elsewhere on the site.



## 4 CONCLUSIONS

### 4.1 Raw Water Intake and Pumping Station site

The main bryophyte habitats within the survey area are soil, boulders and trees at the reservoir edge; the mixed broadleaved woodland ground flora; tree trunks and branches within the mixed broadleaved woodland; fallen and rotting wood; banks and ditches; and, large boulders. These **did not support any rare or protected species** but support a **moderately diverse** site bryophyte flora with 69 bryophytes recorded.

Six species which have less than 10 records within North County Tipperary were recorded. These are generally widespread nationally, and possibly under-recorded in the county. However, they indicate some of the **important bryophyte habitats** on the site such as wet ditches (*Brachythecium rivulare*), shoreline habitat (*Hygrohypnum luridum*), soil on banks in the mixed broadleaved woodland (*Calypogeia arguta*), epiphytic habitat (*Lejeunea cavifolia*, *Orthotrichum lyellii* and *Ulota calvescens*) and large boulders in the woodland (*Lophocolea fragrans*).

### 4.2 Water Treatment Plant site

The main bryophyte habitats within the survey area are hedgerow trees and shrubs and associated banks and dry and wet ditches; wet grassland; and, stonework. These **did not support any rare or protected species** but support a **moderately diverse** site bryophyte flora with 50 bryophytes recorded. Four species which have less than 10 records within North County Tipperary were recorded. These are generally widespread nationally, and possibly under-recorded in the county. However, they indicate some of the **important bryophyte habitats** on the site such as hedgerow banks (*Calypogeia arguta*) and hedgerow epiphytes (*Colura calyptrifolia*, *Homalia trichomanoides* and *Orthotrichum lyellii*).

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## **ANNEX A**

**Raw Water Intake and Pumping Station (Parteen Basin) bryophyte site species list**

Annex A: Raw Water Intake and Pumping Station (Parteen Basin) bryophyte site species list

**Raw Water Intake and Pumping Station bryophyte site species list**

Species	Group	Red List	Grid Reference*	Distribution within site	Distribution nationally	Distribution locally**
<i>Calypogeia arguta</i>	Liverwort	LC		Occasional on damp exposed soil	Widespread	Occasional: <10 records
<i>Cephalozia bicuspidata</i>	Liverwort	LC		Occasional on damp soil and logs	Widespread	Widespread
<i>Cololejeunea minutissima</i>	Liverwort	LC		Occasional epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Diplophyllum albicans</i>	Liverwort	LC		Occasional on damp acid soil	Widespread	Widespread
<i>Drepanolejeunea hamatifolia</i>	Liverwort	LC		Occasional as epiphyte in mixed broadleaved woodland; also epiphyllous (on leaves) in one location	Frequent in N and W areas, occasional elsewhere	Rare: <5 records
<i>Frullania dilatata</i>	Liverwort	LC		Frequent on tree trunks in mixed broadleaved woodland	Widespread	Widespread
<i>Lejeunea cavifolia</i>	Liverwort	LC	R 70075 70185	Occasional on fallen wood and branches	Widespread (except Midlands)	Occasional: <10 records
<i>Lejeunea patens</i>	Liverwort	LC	R 70045 70175; R70050 70206	Occasional on fallen wood and branches	Widespread (except Midlands)	Widespread
<i>Lophocolea bidentata</i>	Liverwort	LC		Frequent on rotting wood	Widespread	Widespread
<i>Lophocolea fragrans</i>	Liverwort	LC	R70045 70175	Locally frequent on several boulders in n mixed broadleaved woodland	Most frequent in W and SW, occasional elsewhere	Occasional: <10 records
<i>Metzgeria consanguinea</i>	Liverwort	LC		Occasional epiphyte n mixed broadleaved woodland	Widespread (except Midlands)	Widespread
<i>Metzgeria furcata</i>	Liverwort	LC		Frequent epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Metzgeria violacea</i>	Liverwort	LC		Occasional epiphyte in mixed broadleaved woodland	Widespread (except Midlands)	Widespread
<i>Microlejeunea ulicina</i>	Liverwort	LC		Occasional epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Pellia endiviifolia</i>	Liverwort	LC		Occasional on calcareous soil at edge of reservoir	Widespread	Widespread
<i>Pellia epiphylla</i>	Liverwort	LC		Occasional on damp soil in mixed broadleaved woodland	Widespread	Widespread

Annex A: Raw Water Intake and Pumping Station (Parteen Basin) bryophyte site species list

Species	Group	Red List	Grid Reference*	Distribution within site	Distribution nationally	Distribution locally**
<i>Plagiochila asplenioides</i>	Liverwort	LC		Locally frequent on large bank in northern part of site	Widespread	Widespread
<i>Plagiochila porelloides</i>	Liverwort	LC		Locally frequent on large bank in northern part of site	Widespread	Widespread
<i>Radula complanata</i>	Liverwort	LC		Occasional epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Amblystegium serpens</i>	Moss	LC		Occasional on lower parts of trees	Widespread	Widespread
<i>Atrichum undulatum</i>	Moss	LC		Frequent in ground flora of mixed broadleaved woodland	Widespread	Widespread
<i>Brachythecium rivulare</i>	Moss	LC		Occasional in wet ditch in northern part of site	Widespread	Occasional: <10 records
<i>Brachythecium rutabulum</i>	Moss	LC		Frequent in ground flora of mixed broadleaved woodland	Widespread	Widespread
<i>Bryum pseudotriquetrum</i>	Moss	LC		Rare on calcareous soil at edge of reservoir	Widespread	Widespread
<i>Calliergonella cuspidata</i>	Moss	LC		Occasional in wet areas of mixed broadleaved woodland	Widespread	Widespread
<i>Campylopus flexuosus</i>	Moss	LC		Occasional on rotting wood and acid soil	Widespread	Widespread
<i>Campylopus introflexus</i>	Moss	LC		Occasional on rotting wood and acid soil	Widespread	Widespread
<i>Cinclidotus fontinaloides</i>	Moss	LC		Occasional on rocks and branches at reservoir edge	Widespread	Widespread
<i>Cirriphyllum piliferum</i>	Moss	LC		Rare in ground flora of mixed broadleaved woodland	Widespread	Widespread
<i>Cratoneuron filicinum</i>	Moss	LC		Occasional in wet areas of mixed broadleaved woodland	Widespread	Widespread
<i>Cryphaea heteromalla</i>	Moss	LC		Frequent epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Ctenidium molluscum</i>	Moss	LC		Rare on calcareous soil at edge of reservoir	Widespread	Widespread
<i>Dicranella heteromalla</i>	Moss	LC		Occasional on rotting wood and acid soil	Widespread	Widespread
<i>Eurhynchium striatum</i>	Moss	LC		Frequent in ground flora of mixed broadleaved woodland	Widespread	Widespread
<i>Fissidens adianthoides</i>	Moss	LC		Rare on calcareous soil at edge of reservoir	Widespread	Widespread
<i>Fissidens bryoides</i> var. <i>bryoides</i>	Moss	LC		Occasional on damp soil in mixed broadleaved woodland	Widespread	Widespread

Annex A: Raw Water Intake and Pumping Station (Parteen Basin) bryophyte site species list

Species	Group	Red List	Grid Reference*	Distribution within site	Distribution nationally	Distribution locally**
<i>Fissidens taxifolius</i>	Moss	LC		Occasional on damp soil in mixed broadleaved woodland	Widespread	Widespread
<i>Fontinalis antipyretica</i>	Moss	LC		Occasional on rocks and branches at reservoir edge	Widespread	Widespread
<i>Homalothecium sericeum</i>	Moss	LC		Occasional epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Hookeria lucens</i>	Moss	LC		Occasional on damp soil in mixed broadleaved woodland	Widespread	Widespread
<i>Hygrohypnum luridum</i>	Moss	LC	R70003 70156	Occasional on rocks at reservoir edge	Widespread, most frequent in upland areas	Occasional: <10 records
<i>Hypnum andoi</i>	Moss	LC		Frequent epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Hypnum cupressiforme</i> var. <i>cupressiforme</i>	Moss	LC		Frequent epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Hypnum cupressiforme</i> var. <i>resupinatum</i>	Moss	LC		Frequent epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Hypnum jutlandicum</i>	Moss	LC		Occasional in ground flora	Widespread	Widespread
<i>Isothecium alopecuroides</i>	Moss	LC		Occasional epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Isothecium myosuroides</i> var. <i>myosuroides</i>	Moss	LC		Frequent epiphyte	Widespread	Widespread
<i>Kindbergia praelonga</i>	Moss	LC		Frequent in ground flora in mixed broadleaved woodland	Widespread	Widespread
<i>Mnium hornum</i>	Moss	LC		Occasional on damp soil and logs	Widespread	Widespread
<i>Neckera complanata</i>	Moss	LC		Occasional epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Neckera pumila</i>	Moss	LC		Frequent epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Orthotrichum affine</i>	Moss	LC		Frequent epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Orthotrichum lyellii</i>	Moss	LC		Occasional epiphyte in mixed broadleaved woodland	Widespread	Rare: <5 records

Annex A: Raw Water Intake and Pumping Station (Parteen Basin) bryophyte site species list

Species	Group	Red List	Grid Reference*	Distribution within site	Distribution nationally	Distribution locally**
<i>Orthotrichum tenellum</i>	Moss	LC	R 70154 70092	Rare epiphyte in mixed broadleaved woodland	Widespread	Widespread
<i>Oxyrrhynchium hians</i>	Moss	LC		Frequent in ground flora in mixed broadleaved woodland	Widespread	Widespread
<i>Plagiomnium rostratum</i>	Moss	LC		Occasional in ground flora in mixed broadleaved woodland	Widespread	Widespread
<i>Plagiomnium undulatum</i>	Moss	LC		Occasional in ground flora in mixed broadleaved woodland	Widespread	Widespread
<i>Plagiothecium nemorale</i>	Moss	LC	R 70064 70187	Occasional on damp soil in mixed broadleaved woodland	Widespread	Widespread
<i>Plagiothecium undulatum</i>	Moss	LC		Occasional in ground flora in mixed broadleaved woodland	Widespread	Widespread
<i>Platyhypnidium riparioides</i>	Moss	LC		Occasional on rocks at reservoir edge	Widespread	Widespread
<i>Pogonatum aloides</i>	Moss	LC		Occasional on exposed soil in mixed broadleaved woodland	Widespread	Widespread
<i>Polytrichastrum formosum</i>	Moss	LC		Occasional on damp acid soil	Widespread	Widespread
<i>Pseudoscleropodium purum</i>	Moss	LC		Occasional in ground flora in mixed broadleaved woodland	Widespread	Widespread
<i>Pseudotaxiphyllum elegans</i>	Moss	LC		Occasional on damp acid soil	Widespread	Widespread
<i>Rhytidiadelphus squarrosus</i>	Moss	LC		Occasional in open grassy areas at edge of woodland	Widespread	Widespread
<i>Thamnobryum alopecurum</i>	Moss	LC		Frequent in ground flora of mixed broadleaved woodland	Widespread	Widespread
<i>Thuidium tamariscinum</i>	Moss	LC		Frequent in ground flora of mixed broadleaved woodland	Widespread	Widespread
<i>Ulota calvescens</i>	Moss	LC	R7015 7009	Rare on edge of conifer plantation	Occasional to frequent in W, rare elsewhere	Occasional: <10 records
<i>Ulota crispa</i> s.l.	Moss	LC		Occasional as epiphyte in mixed broadleaved woodland	Widespread	Widespread

\*Irish Grid (TM65); \*\*Within North Tipperary Vice County (H10)

## **ANNEX B**

**Water Treatment Plant site (Birdhill) bryophyte site species list**

## Water Treatment Plant site bryophyte species list

Species	Group	Red List	Grid Reference*	Distribution within site	Distribution nationally	Distribution locally**
<i>Calypogeia arguta</i>	Liverwort	LC		Occasional on soil on hedgerow banks	Widespread	Occasional: <10 records
<i>Colura calyptrifolia</i>	Liverwort	LC	R722 704	Occasional: <10 records	Most frequent in N, W and upland areas	Occasional: <10 records
<i>Frullania dilatata</i>	Liverwort	LC		Frequent epiphyte on hedgerow trees	Widespread	Widespread
<i>Lophocolea bidentata</i>	Liverwort	LC		Occasional in grassland and hedgerow banks	Widespread	Widespread
<i>Metzgeria furcata</i>	Liverwort	LC		Frequent epiphyte on hedgerow trees	Widespread	Widespread
<i>Metzgeria violacea</i>	Liverwort	LC		Occasional epiphyte on hedgerow trees	Widespread	Widespread
<i>Pellia epiphylla</i>	Liverwort	LC		Rare in wet grassland in S of site	Widespread	Widespread
<i>Radula complanata</i>	Liverwort	LC		Occasional epiphyte on hedgerow trees	Widespread	Widespread
<i>Riccardia chamedryfolia</i>	Liverwort	LC		Occasional in wet grassland in S of site	Widespread	Widespread
<i>Amblystegium serpens</i>	Moss	LC		Occasional in hedgerows	Widespread	Widespread
<i>Atrichum undulatum</i>	Moss	LC		Occasional in hedgerows	Widespread	Widespread
<i>Barbula convoluta</i> var. <i>convoluta</i>	Moss	LC		Occasional on stonework	Widespread	Widespread
<i>Barbula unguiculata</i>	Moss	LC		Occasional on stonework	Widespread	Widespread
<i>Brachythecium rutabulum</i>	Moss	LC		Frequent in wet grassland and hedgerow	Widespread	Widespread
<i>Bryum capillare</i>	Moss	LC		Occasional on stonework	Widespread	Widespread
<i>Calliergonella cuspidata</i>	Moss	LC		Occasional in wet grassland in S of site	Widespread	Widespread
<i>Cryphaea heteromalla</i>	Moss	LC		Frequent epiphyte on hedgerow trees	Widespread	Widespread
<i>Dicranella heteromalla</i>	Moss	LC		Rare on soil on hedgerow banks	Widespread	Widespread
<i>Dicranella varia</i>	Moss	LC		Occasional on hedgerow banks	Widespread	Widespread
<i>Eurhynchium striatum</i>	Moss	LC		Occasional on hedgerow banks	Widespread	Widespread
<i>Fissidens bryoides</i> var. <i>bryoides</i>	Moss	LC		Occasional on hedgerow banks	Widespread	Widespread
<i>Fissidens taxifolius</i>	Moss	LC		Occasional on hedgerow banks	Widespread	Widespread
<i>Homalia trichomanoides</i>	Moss	LC		Rare within western hedgerow	Widespread	Rare: <5 records
<i>Homalothecium sericeum</i>	Moss	LC		Occasional epiphyte on hedgerow trees	Widespread	Widespread
<i>Hookeria lucens</i>	Moss	LC		Occasional in W hedgerow bank adjacent to stream	Widespread	Widespread

Annex B: Water Treatment Plant site (Birdhill) bryophyte site species list

Species	Group	Red List	Grid Reference*	Distribution within site	Distribution nationally	Distribution locally**
<i>Hypnum cupressiforme</i> var. <i>cupressiforme</i>	Moss	LC		Frequent epiphyte on hedgerow trees	Widespread	Widespread
<i>Hypnum cupressiforme</i> var. <i>resupinatum</i>	Moss	LC		Frequent epiphyte on hedgerow trees	Widespread	Widespread
<i>Isothecium alopecuroides</i>	Moss	LC		Occasional epiphyte on hedgerow trees	Widespread	Widespread
<i>Isothecium myosuroides</i> var. <i>myosuroides</i>	Moss	LC		Rare on hedgerow banks	Widespread	Widespread
<i>Kindbergia praelonga</i>	Moss	LC		Frequent in hedgerows and occasional in grassland	Widespread	Widespread
<i>Mnium hornum</i>	Moss	LC		Rare on hedgerow banks	Widespread	Widespread
<i>Neckera complanata</i>	Moss	LC		Occasional epiphyte within hedgerows	Widespread	Widespread
<i>Neckera pumila</i>	Moss	LC		Frequent epiphyte on hedgerow trees	Widespread	Widespread
<i>Orthotrichum affine</i>	Moss	LC		Occasional epiphyte within hedgerows	Widespread	Widespread
<i>Orthotrichum lyellii</i>	Moss	LC		Occasional epiphyte within hedgerows	Widespread	Rare: <5 records
<i>Orthotrichum stramineum</i>	Moss	LC		Occasional epiphyte within hedgerows	Widespread	Widespread
<i>Orthotrichum tenellum</i>	Moss	LC		Occasional epiphyte within hedgerows	Widespread	Widespread
<i>Oxyrrhynchium hians</i>	Moss	LC		Frequent on ground in grassland and hedgerows	Widespread	Widespread
<i>Pogonatum aloides</i>	Moss	LC		Occasional on hedgerow banks	Widespread	Widespread
<i>Pohlia melanodon</i>	Moss	LC		Occasional in wet grassland in S of site	Widespread	Widespread
<i>Polytrichum commune</i>	Moss	LC		Occasional in wet grassland in S of site	Widespread	Widespread
<i>Pseudoscleropodium purum</i>	Moss	LC		Occasional in grassland	Widespread	Widespread
<i>Rhytidiadelphus squarrosus</i>	Moss	LC		Occasional in grassland	Widespread	Widespread
<i>Thamnobryum alopecurum</i>	Moss	LC		Occasional within hedgerows	Widespread	Widespread
<i>Thuidium tamariscinum</i>	Moss	LC		Occasional within hedgerows	Widespread	Widespread
<i>Tortula muralis</i>	Moss	LC		Occasional on stonework	Widespread	Widespread
<i>Ulota bruchii</i>	Moss	LC		Occasional epiphyte within hedgerows	Widespread	Widespread
<i>Ulota crispa</i> s.l.	Moss	LC		Occasional epiphyte within hedgerows	Widespread	Widespread
<i>Ulota phyllantha</i>	Moss	LC		Occasional epiphyte within hedgerows	Widespread	Widespread
<i>Zygodon conoideus</i>	Moss	LC	R 722 703	Occasional epiphyte within hedgerows	Widespread	Widespread

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