

Appendix 6-6

Timahoe North Draft Rehabilitation Plan 2017

BORD NA MÓNA
Naturally Driven

Draft Rehabilitation Plan

2017

Timahoe North Bog

*This rehabilitation plan is developed under Condition 10 of IPC Licence Ref. 503 (April 2017). It outlines measures that will provide for stabilisation of the bog area upon cessation of peat production and decommissioning of the site. **Rehabilitation** generally comprises natural colonisation with or without targeted management. **After-use** involves the development of cutaway peatland into other land-uses. Rehabilitation can be incorporated into after-use development (e.g. Mountlucas Windfarm). Bord na Móna has focused after-use development of cutaway bogs into forestry, agriculture, grassland, amenity and biodiversity, (Lough Boora Discovery Park) and commercial industrial development (Drehid Resource Recovery, renewable energy – Mountlucas Windfarm). This rehabilitation plan **does not** outline future after-use development for Timahoe North Bog. The general after-use strategy of Bord na Móna is outlined in the Bord na Móna Strategic Framework for Future-Use of Cutaway Bogs 2011. Any consideration of future after-uses for Timahoe North Bog such as amenity, developments or mixed uses will be conducted following the relevant planning guidelines and consultation with relevant authorities and will be considered within the framework of this rehabilitation plan.*

Rehabilitation of industrial peatlands is a key objective of the Bord na Móna Biodiversity Action Plan 2016-2021. This action plan outlines the main objectives and actions around biodiversity on Bord na Móna lands.

Draft Rehabilitation Plan			
Bog Name:	<u>Timahoe North</u>	Area (ha):	807 ha
Works Name:	Ballydermot	County:	Kildare
Author(s):	BnM Ecology Team	Survey/Monitoring Date(s):	20/04/2010 23/09/2014, 29/09/2014 10/2016
Maps:	Habitats Map, Future Habitats Map, Landuse Map		
Review status: Reviewed Spring 2017.			
<p>Background</p> <p>Bord na Móna operates under IPC Licence issued and administered by the EPA to extract peat within the Allen - Lullymore bog group (Ref. 503). As part of Condition 10.2 of this license, a rehabilitation plan must be prepared for permanent rehabilitation of the boglands within the licensed area. Timahoe North bog is part of the Allen - Lullymore bog group.</p> <p>This plan is a specific rehabilitation plan for Timahoe North bog and outlines:</p> <ul style="list-style-type: none"> • criteria which define the successful rehabilitation, • consultation to date with interested parties, • main issues for rehabilitation, • proposed rehabilitation programme, • proposed timeframe to implement this programme, and, • associated aftercare, maintenance and monitoring. <p>The basis for the proposed approaches and implementation is the experience gained in 40 years of research on the after-use development and rehabilitation of the Bord na Móna cutaway bogs (see reference documents).</p>			
<p>Scope</p> <p>The scope of the rehabilitation plan seeks to address issues of concern as identified by Bord na Móna and the consultees. The key issues identified are:</p> <ul style="list-style-type: none"> • Categorisation of the habitats developing on Timahoe North Bog (outlined in Appendix I) • Environmental stabilisation of the former peat production areas • Maintenance of drainage and silt control through the site • Remediation of water courses where necessary (<i>decommissioning</i>) • The timeframe for bog rehabilitation/restoration • The impact of any other proposed development on the site and rehabilitation plan 			
<p>List of consultees to date</p> <ul style="list-style-type: none"> • Open consultation with range of stakeholders at annual BAP review days 2010-2017. • Consultation with NPWS regarding use of part of Timahoe North Bog (Drumachon) as a turf-cutting relocation site. • This rehabilitation plan remains a draft plan until formal consultation is carried out with relevant stakeholders. 			
<p>Site description</p> <p>Timahoe North is located approximately 7.6 kilometres east of Carbury in County Kildare. The Carbury to Timahoe public road forms a boundary with the south of the site while another secondary road runs close to the eastern boundary of the site. An adjacent BnM property called Timahoe South is located adjacent to the southern side of this bog.</p>			

Production of sod peat by Bord na Móna ceased in Timahoe in the 1980's. Peat production at Timahoe was never converted to milled peat. The majority of the site has developed as cutaway since then. There is still a significant amount of peat still present in Timahoe (fuel peat layers).

The majority of the site is currently classed as cutaway apart from some sod-peat production areas, remnant high bog and cutover bog around the margins. The relatively long period of time since production has ceased has meant that the majority of the site has successfully re-vegetated and that some of the habitats are better developed and more diverse than other cutaway sites, which may be younger. However there still is a significant amount of disturbance on site with commercial sod turfcutting by contractors in several different locations. Old drainage systems are still in place although these drainage systems appear to be breaking down. As a result the drains appear to be developing a more naturalised appearance with pools and areas where the steep banks have fallen away. Many of the deep drains are quite silted up. Silt-ponds were never developed in Timahoe as production had ceased during their period of development. However, the large deep arterial drains through the site have acted as silt-ponds.

The majority of the site has either re-vegetated with dry heath or with Birch scrub in various stages of development. The development of vegetation communities seems to be strongly correlated with time since sections were taken out of production, with the oldest sections containing Birch scrub/woodland. The central section contains more frequent poor fen communities (Bog Cotton), where there has been more recent activity. Some small hollows still contain open water with associated wetland vegetation around them and there is some more extensive open water with wetland habitats developing along the southern railway embankment. A large section of the site towards the south-east corner has been burnt recently (mainly scrub and dry heath) but is regenerating.

One notable feature of the re-vegetation at Timahoe North is that some small wet hollows have developed embryonic bog communities dominated by *Sphagnum* spp. This is as a result of the deeper peat left on site affecting the water chemistry differently (more acidic) compared to more typical cutaway where the water chemistry is generally more calcareous. However, this type of re-generation is very localised at present over a very small area.

A small area of un-drained raised bog (PB1) is located at the southern end of the site. This section of high bog was partially damaged by burning, but also had a small wet area that could be classified as 'active raised bog'.

Peat production programme, land-use and proposed developments

- Industrial milled peat production in Timahoe North has ceased. There are no plans to recommence industrial milled peat production at this site and the site is zoned as cutaway.
- There is ongoing commercial sod-turf production by contractors, which is likely to be continued for the foreseeable future.
- The site is currently being assessed (pre-planning) for a solar energy development by Bord na Mona.

Other considerations

- **Cessation of peat production.** Bord na Móna announced in 2015 that peat production for the generation of electricity was to cease by 2030 (http://www.bordnamona.ie/wp-content/uploads/2016/01/Sustainability_Statement_2015.pdf). Industrial peat production (with regard to all appropriate regulations) to supply other customers or sectors (e.g. horticulture) may continue after this date.
- **Peat extraction regulations.** New regulations for the extraction of peat are currently being drafted by government. Peat extraction on sites greater than 30 ha will be regulated through IPC licencing administered by the EPA. This draft rehabilitation plan has been prepared under the conditions of the original IPC licence.
- **Bord na Móna railway.** This bog railway is an active link to Edenderry Power station (EPL). Decommissioning of this infrastructure is dependent on the general cessation of industrial peat production for supply of peat to EPL.
- **Drainage.** Timahoe North is a gravity-drained bog. Drainage seems to be breaking down and some

sections are re-wetting as drains have naturally blocked.

- **Sod turf production.** There is significant amount of sod-turf production at Timahoe North by private contractors. There is also a significant amount of unauthorized private sod-peat cutting on the cutaway.
- **Amenity.** The site is used by dog-walkers and for horse-riding.
- **SAC Turf re-location site:** Drumachon Bog is currently being assessed by BnM in consultation with NPWS for use as part of the SAC turf-cutting compensation scheme. Turf-cutters from a neighbouring SAC (Mouds Bog) could be relocated to this site by NPWS.
- **Irish Water Pipeline.** The current Irish Water plans to build the west-east water pipeline overlap with the southern margin of the site.

Key biodiversity features of interest (2017)

- This site is quite unique in that industrial peat production has ceased and it has been cutaway for a relatively long period of time. This has allowed the development of large areas of Birch and Pine scrub/woodland in mosaic with dry heath and poor fen vegetation communities that are somewhat better developed and more diverse than seen at other comparable sites. The majority of the site has re-vegetated to some degree (apart from those areas where there is still private sod-peat cutting).
- The former history of the site as a sod peat production area has meant that there is still significant volume of more acidic bog peat left on site, compared to milled cutaway sites where fen peat is left. This is allowing the development of embryonic raised bog and *Sphagnum*-rich poor fen communities in places as well as extensive development of other more acidic communities like dry heath. This feature marks out this site as being somewhat unusual and also having relatively more biodiversity value compared to other (more typical midland poor fen) cutaway sites due to such a large site developing these types of communities.
- There is also a small amount of open water and wetland habitat on site that may be increasing in extent recently due to drains being recently impeded.
- A small area of high bog (Drumachon). This bog remnant has been burnt in the recent past but still retains typical raised bog characteristics (that qualifies as the Annex I EU Habitats Directive habitat – ‘degraded raised bogs still capable of regeneration’ – 7120). (Number codes refer to EU habitat classification system – European Commission 1996). The bog also contains a small wet area of ‘active’ raised bog, which qualifies as the Annex I EU Habitats Directive habitat – ‘active raised bog’ (7110). This bog remnant was noted in the IPCC Bog of Allen survey (Hurley 2005) as having regional ecological value. This bog remnant was also assessed as part of the Kildare Wetland Survey (Foss & Crushell 2014). Currently turf-cutting is ongoing around this high bog area and cutting into the surrounding drained area of the bog remnant.
- The site is a significant refuge for wildlife. Species of conservation interest that were noted in the area included Snipe, Buzzard and Cuckoo. Breeding birds also include Snipe, Lapwing and Teal (Biosphere Environmental Services 2014). Occasional small flocks of Golden Plover and Lapwing use the site during winter as do Peregrine and Hen Harrier.
- Small Skipper Butterfly. Timahoe North was one of the first sites in Ireland where this recent butterfly colonist has been recorded. It is present along the grassy old railway areas.

Current ecological rating (A-E; following NRA Guidelines)

A large part of the site can be rated as having a **County ecological value (C)** as it attracts breeding wetland birds. The active peat production areas have a lower ecological value (**E**). Kildare Wetland Survey proposes the site as having National Ecological Value (**B**).

Criteria defining successful rehabilitation

- The main criteria are stabilisation of the former peat production area and mitigation of potential silt run-off.

Wide-spread peat production has ceased at Timahoe North for over 20 years. In that period there has been extensive re-vegetation. The majority of the site has already re-vegetated, although habitat development is at

different stages. Older sections are developing dense Birch woodland and scrub while areas where there was more recent activity tend to have younger pioneer poor fen vegetation communities. The breakdown of drainage within the site has led to more recent development of some wetland.

There is active sod-turf production throughout the site and bare peat is associated with these areas. It is expected that natural colonisation will form the basis for the stabilisation of un-vegetated cutaway and that the bare peat areas will re-vegetate into the future in similar way to the already revegetating cutaway. Pioneer poor fen communities are already developing in those areas that have been used for sod peat production more recently but have been abandoned.

Much of Timahoe North has already re-vegetated and there is no requirement at present for any significant active rehabilitation at this site. Areas with more recent activity are expected to re-vegetate naturally in a similar manner.

No active rehabilitation is anticipated for any of the other remnant raised bog around the margins of the site as these areas are still being used for private sod peat cutting or are too small for any active raised bog restoration and will be allowed to develop naturally. Private sod-peat cutting is likely to continue around some parts of the margins for some time.

- Remediation of silt ponds and/or watercourses, where required.
- At this point in time, 83% of the site is expected to develop as Birch woodland, dry heath and scrub, 8% is expected to remain as raised bog and 8% has potential to develop as mosaic of wetland habitats.
- At this time, less than 10% of the site is considered bare peat and requiring some rehabilitation work.

Development Scenario

A potential renewable energy development at Timahoe North would have a significant impact on the landscape of the site and rehabilitation of the site. Any proposed development would have to undertake EIS, which would also consider rehabilitation, habitats already developing in the cutaway and stabilisation of the site.

One of the main Bord na Moña rehabilitation strategies is to re-wet cutaway where possible. Drain blocking and berm creation has proven to be a very effective tool in raising the water table, re-wetting remnant peat and aiding the development of wetland habitats, as well as being generally positive for Greenhouse Gas fluxes from the cutaway (in the longterm). Drain blocking can be widespread in scale with each field drain being blocked (e.g. Lullymore in the Ballydermot Works) or more localised with only the main outfall being blocked (e.g. Drumman) and both can be very effective. This can be used in conjunction with local topographical features like natural hollows to create wetlands or with other typical features of cutaway peatlands like high peat fields, which act as berms to hold water to some extent.

Active management to create low berms to hold water back and create shallow wetland habitats dominated by emergent vegetation has also been successfully trialled (e.g. Oweninny, Lough Boora Discovery Park, Ballycon). In conjunction with the wind farm development and associated roads and embankments there are likely to be further opportunities to raise localised water levels and/or block localised drains to create a shallow mosaic of wetland habitats, using the new construction as a partial embankment, where possible. The main objective of this rehabilitation is to enhance re-wetting of the cutaway where possible, creating small wetland features to enhance biodiversity and also enhance mitigation of silt run-off.

The main objective of any Timahoe North Solar Energy drainage plan will be to drain and protect the solar farm infrastructure and minimize water from the cutaway accessing this infrastructure. The adjoining bog around the infrastructure will be used as temporary storage of water during high levels of rainfall and this will enhance the development of shallow wetland habitat mosaics and also mitigate silt run-off. There will be opportunities at Timahoe North for localised drain-blocking, re-wetting of peat and creation of shallow wetland mosaic features in association with the construction and management of the windfarm infrastructure. This objective proved successful at Mountlucas Windfarm, where several small wetland features were maintained and enhanced by local berm creation using peat spoil from road construction. Overflow pipes were also used to maintain maximum water levels and protect windfarm infrastructure from flooding during periods of high rainfall.

There may also be further opportunities for some deep peat re-wetting in the north-west area with more intensive drain-blocking. The main objective in these areas is the restoration of raised bog habitats and the development of embryonic raised bog vegetation communities.

It is not the objective of this rehabilitation plan to create large wetland features dominated by deeper open water

that may potentially attract relatively large flocks of wintering waterbirds.

The extent of shallow wetland habitat (low scrub, emergent reeds and sedges) could be increased with active management such as drain blocking and low level berm creation at localised points. This may benefit the management of the wind farm, as taller vegetation (mature Birch woodland) may have to be controlled as it could interfere with the performance of the wind farm. Birch woodland is likely to be the climax habitat for drier parts of the cutaway.

- The main criteria for successful rehabilitation in this scenario are the development and implementation of a suitable design through the environmental planning process. The various plans and designs for the site will have to take account of the various issues relating to mobilised peat and peatland rehabilitation and the final outcome will involve a landscaped site with developing habitats that are sustainable and stable.

Proposed Rehabilitation programme (No development scenario)

Completed

- The majority of the cutaway (apart from those areas used for commercial sod-peat production) has already re-vegetated naturally and has developed a range of habitats. Less than 10% of the site is considered bare peat and much of this is in areas used by commercial sod peat production. Natural colonisation has been quite effective at this site. Some areas remain bare peat – former headlands and travel paths. These bare peat areas are shrinking as vegetation develops and consolidates.

Short-term (0-2 years)

- The most sustainable management option for unvegetated areas within the site is to allow continued natural re-colonisation of the site.
- Significant bare peat areas through the site and the progress of natural re-colonisation of the active peat production areas will be monitored.
- Opportunities for localised creation of small wetland habitat mosaics and re-wetting of *Sphagnum*-rich poor fen habitats will continue to be explored.
- Drainage from the site will be monitored for potential silt run-off. There will be continued maintenance and cleaning (if required) to prevent silt run-off from the site during the rehabilitation phase.
- Land-use and development of Timahoe North will be monitored and any changes in land-use will be re-assessed for rehabilitation, if required.

Long-term

- Monitoring of the site to ensure stabilisation and complete re-vegetation.
- Rehabilitation of the active sod-peat production area will be considered when production ceases. Natural re-colonisation is probably the best option for this area and already there is some re-colonisation where there has been no activity for several years.
- Evaluate success of short-term rehabilitation measures outlined above and enhance where necessary (to be determined by selected short-term management above).
- Reporting to the EPA will continue until the IPC License is surrendered.

Proposed Rehabilitation programme (Development scenario)

Short-term (0-2 years)

- Work with development team to create a suitable design that incorporates natural cutaway habitat features into the design of the development. Any development may mean there are opportunities for rehabilitation, re-wetting and creation of new wetlands and *Sphagnum*-rich poor fen habitats, and also raised bog restoration.

Timeframe for rehabilitation

Short-term (2017-2019) (No development scenario)

- Assess potential to implement and complete rehabilitation measures.
- Continue to monitor re-vegetation of the bare cutaway areas; implement rehabilitation measures once decommissioning is signed off.

Long-term

- This phase will follow on from cessation of peat production in adjacent bogs
- Continued monitoring and planning will take place to assess further rehabilitation requirements at this site taking account of ongoing sod-turf production on the site (when production ceases).
- Reporting to the EPA will continue until the IPC License is surrendered.

Proposed Rehabilitation programme (No-development scenario)

Short-term (2017-2019)

- Work with development team to create a suitable design that incorporates natural cutaway habitat features into the design of the development. Any development may mean there are opportunities for rehabilitation, re-wetting and creation of new wetlands and *Sphagnum*-rich poor fen habitats, and also raised bog restoration.

After-care and maintenance

- There will be annual assessments of the site to determine the progress of the rehabilitation work and requirements for further enhancement measures.
- It is not expected that there will be any requirement for after-care and maintenance other than ecological monitoring.
- Where other uses are proposed for the site, these will be assessed by Bord na Móna in consultation with interested parties. Other after-uses can be proposed for licensed areas and must go through the appropriate assessment and planning procedures.

Potential future natural habitats on the site

This section attempts to predict the development of natural habitats on the site, assuming current land-use and known after-use plans for the cutaway (development etc). This prediction is based on research and methods used to predict the natural vegetation of Ireland (Cross 2005). Cross (2005) predicted that cutaway bog is likely to develop a mosaic of Birch forest, alder and ash-alder carr, fen and heath in the future. There is no time-line given for the development of these habitats, although it could be expected that the development of natural climax habitats could take hundreds of years. The complexity is the result of small scale variations in the substrate and other environmental factors such as drainage and ground-water influence.

- The main habitat that will develop over most of this site is Birch woodland (WN7). This will generally be dominated by Birch although significant areas may be dominated by Pine or mixed woodland of conifers and Birch. Over time there is potential for other tree species such as Oak to colonise the site.
- The woodland is likely to develop in association with more open areas of dry heath (HH1), poor fen (PF2) and scrub mosaics (WS1) that are slow to colonise with trees. There is also likely to be some small wetlands that will remain open in the future that will contain poor fen (PF2), some areas of open water (FL3) and wet Willow-dominated woodland (WN6).
- Small areas may continue to develop as embryonic bog communities. There is potential for some sections to re-develop as peat-forming and even as 'raised bog' (PB1) but this is not likely to be extensive.
- The remnant high bog is likely to remain as peatland (PB1) for the near future, although parts of it are

likely to continue to dry out and may become more heath-like in the future.

Budget and costing

It is anticipated that the majority of the rehabilitation at this site will be through natural re-colonisation and this has already led to almost complete environmental stabilisation of the site other than the active sod peat areas. Some preliminary budgeting can be carried out assuming that approximately 10% of the site remains as bare peat and there may be some potential for active management to enhance re-wetting. There may also be opportunities to combine rehabilitation/bog restoration with future planned development for the site. The allocated rehabilitation provision will be based on this estimate.

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APPENDIX I

Ecological Survey Report			
<i>Note: This report outlines an ecological survey of the bog. This report should not be taken as a management plan for the site as other land-uses may still be considered. Information within this report may inform the development of other land-uses and identify areas with particular biodiversity value.</i>			
Bog Name:	Timahoe North	Area (ha):	806 ha
Works Name:	Ballydermot	County:	Kildare
Recorder(s):	MMC & DF	Survey Date(s):	20/04/2010
Habitats present (in order of dominance)			
The most common habitats present at this site include:			
<ul style="list-style-type: none"> • Dry Heath (dHeath) dominated by Heather has developed over large areas of the site mainly in mosaic with grassier areas of Bog Cotton and also with various stages of scrub. In most areas of this habitat trees are establishing. • Birch scrub at emergent (eBir), open (oBir) and closed (cBir) stages of development. Some sections have developed sufficiently to be classified as Birch woodland (WN7). The northern half contains significant naturally colonising Pine that dominates in some sections. (Codes refer BnM classification of pioneer habitats of production bog. See Appendix II). • Cutover Bog (PB4). Parts of the site are being intensively cut for private sod peat production with bare peat and pioneer communities most common. (Codes refer to Heritage Council habitat classification, Fossitt 2000, See Appendix II.) • Poor fen, with Bog Cotton-dominated vegetation (pEang) most common. (It should be noted that this community contains more frequent indicators of acidic substrate (bog-wet heath vegetation) compared to other sites). Other communities present include pJeff and pRos. • Dry grassland (gDac-Arr) (developing to GS2) along the main railway embankments. This habitat occurs in association with patches of Nettle, Willowherb and Bramble. There is also a transitional zone dominated by Purple Moor-grass at the base of the embankment adjacent to the other cutaway habitats. • Open water (OW) including temporary-flooded sections (tOW) • Raised bog (PB1), remnant sections of raised bog occur along some of the fringes of the site • Birch woodland (WN7) occurs in some small patches around the margins of the site. • Reedbeds (pPhrag) (minor in extent) • Riparian zones (RIP) (old drains) with associated fringe scrub. • A very small area is developing an embryonic bog community (PBa) 			
Description of site			
<p>Timahoe North is located approximately 7.6 kilometres east of Carbury in County Kildare. The Carbury to Timahoe public road forms a boundary with the south of the site while another secondary road runs close to the eastern boundary of the site. A Coillte owned conifer plantation is located adjacent to the site along the northern end of the site. An adjacent BnM property called Timahoe South is located adjacent to the southern side of this bog. The surrounding landscape is quite flat and largely dominated by farmland. Much of the grassland located adjacent to the site boundaries has been reclaimed in the past from bogland. The other main habitats found around the margins include typical small patches of cutover and remnant high bog and associated scrub/Birch woodland located outside the Bord na Móna boundary.</p> <p>The majority of the site is currently classed as cutaway apart from some remnant high bog and cutover bog around the margins. It was commercially harvested for horticultural peat until 1980's with different sections probably coming out of production prior to this date. The relatively long period of time since production has</p>			

ceased has meant that the majority of the site has successfully re-vegetated and that some of the habitats are better developed and more diverse than other cutaway sites, which may be younger. However there still is a significant amount of disturbance on site with private sod peat-cutting in several different locations. Some of this peat-cutting is quite extensive and commercial in scale. Large areas of bare peat remain on the site as a result of active turf cutting and there are also areas with younger pioneer vegetation as a result of these activities.

The majority of the site has either revegetated with dry heath (dHeath) or with Birch scrub (oBir/cBir) in various stages of development. The development of vegetation communities seems to be strongly correlated with time since sections were taken out of production, with the oldest sections containing Birch scrub/woodland. The youngest sections and areas that have been most recently disturbed seem to be dominated by Poor Fen communities or still have some bare peat. Hydrology is also an important factor and some of the damper or lower areas also seem to be dominated by Bog Cotton-dominated vegetation rather than dry heath. Some small hollows still contain open water with associated wetland vegetation around them and there is some more extensive open water developing along the southern railway embankment.

The Birch scrub/woodland found on the site is in various stages of development. Significant areas did have a closed canopy but when they were investigated, the woodland development as yet was poor with no significant layer structure. (All of the best-developed scrub/woodland has been mapped as closed Birch at this site although some of it deserves to be called Birch woodland with canopies regularly above 5 m high. This is because of the difficulty of separating Birch woodland from mature scrub, especially for stands where there was no ground-truthing). Birch was generally the most dominant species with some sections being quite evenly-aged. Pine and Willow were occasionally found within the stands along with a few Hawthorn specimens. The ground cover was generally dry and dominated by Bramble or Heather (in the younger stands). Other typical woodland species included Elder, Rose sp., Creeping Buttercup, Goose-grass, Raspberry, Herb Robert, Hogweed, Nettle, Harts-tongue (along drain), Nettle, Ivy, Bracken, Common Dog Violet, Dandelion, Broad Buckler Fern, Male Fern, Scaly Male Fern. Some of the best developed ground flora is found along the main drains that have been wooded for some time. Some sections to the north, particularly adjacent to the conifer plantation, contain much more Pine (both Lodgepole and Scots Pine), which dominates in places. Birch or Pine scrub is found in association with the dry heath and the poor fen communities and a significant part of the site contains dry Heather-dominated vegetation with light-heavy cover of Birch or Pine at the sapling/young tree stage. Gorse is also present. These areas are likely to eventually become wooded in future.

Dry Heath is generally dominated by tall Heather. This community can still contain a significant cover of bare peat in some places. Other typical species include Cross-leaved Heath, Purple Moor-grass, Common Bog Cotton and *Cladonia* spp. One feature of interest is the presence also of more typical bog species such as White Beak Sedge and Hare's-tail Bog Cotton indicating the presence of more acidic peat than typical of cutaway sites. Hummocks of *Sphagnum palustre* and *S. subnitens* are also occasionally found throughout this vegetation type, especially in the damper sections where there is greater cover of Common Bog Cotton. Hummocks of *S. capillifolium* are also present. Other typical bryophytes include *Campylopus introflexus*, *Hypnum* spp. and *Polytrichum juniperum* (particularly on the bare peat between the Heather bushes) and large hummocks of *Polytrichum commune*. The dry heath is frequently found with Birch, Willow and Pine scattered through it forming scrub/heath mosaics.

A large section of the site towards the south-east corner has been burnt recently (mainly scrub and dry heath). There is a significant amount of standing dead and badly damaged Birch trees and trees of other species. The Heather cover has also been burnt and is beginning to regrow again. Bare peat is a prominent feature of this area and Purple Moorgrass is also frequent in sections.

The main poor fen community found at this site was dominated by Common Bog Cotton. Other species present include Purple Moorgrass, Soft Rush and *Polytrichum commune* hummocks. Again this community exhibited characteristics typical of more acidic peat with the occasional presence of *S. palustre*, *S. subnitens* and *S. capillifolium*, along with White Beaked Sedge and Hare's-tail Bog Cotton. The latter two species are not generally found within typical poor fen vegetation present on milled peat cutaways so the classification of this community may need to be reconsidered in the future, perhaps as an embryonic bog community. Frequently, gradual transitions from dry heath dominated by Heather to poor fen dominated by Common Bog Cotton were present.

Open water and associated poor fen habitats was not a common habitat at this site. Several small hollows with shallow open water and mainly associated with emergent poor fen vegetation were present. Some of these hollows exhibited more typical poor fen characteristics with the dominance of Bottle Sedge with species such as Jointed Rush, Mint, Cuckoo Flower and *Calliergonella cuspidata*, and the appearance of small stands of Common Reed and Reedmace. More extensive open water was found along the central part of the southern railway embankment. This area has the appearance of being in rapid transition at present, as the open water

was much more extensive on the ground compared to its extent from the aerial photos (2004). There were also significant areas of 'drowned scrub' in places where scrub (and some heath) had been affected by shallow water. Poor fen dominated by Soft Rush was more commonly found associated with these wetlands.

A small wetland located in the southern part of the site seems to have some base-rich influence in contrast with the rest of the site (See map). This area was dominated by Bottle Sedge and contained other typical species such as Mint, Jointed Rush, Mint, Forget-Me-Not, Bog Bean, Cuckoo Flower and *Calliergonella cuspidata*, and the appearance of small stands of Common Reed and Reedmace. The Bottle Sedge dominated vegetation was surrounded by Bog Cotton vegetation. During the second visit the site could be explored more extensively as water levels had lowered. A small open area contained Charophytes and Pondweed. Of interest was the appearance of two potential rich fen indicators, *Campyllum stellatum* and *Ctenidium molluscum*, both mosses, within the outer zone dominated by Bog Cotton. This small area is likely to be spring-fed and appears as a bright circular patch on the aerial photos.

A small wet hollow on the site was classified as an embryonic bog community. This area was dominated by Common Bog Cotton (like poor fen). However, associated with it were extensive carpets of *S. cuspidatum* and other typical raised bog species such as Cross-leaved Heath, Hare's-tail Bog Cotton, *Polytrichum* sp., White-beaked Sedge and hummocks of *S. subnitens* and *S. palustre*. Other areas with Bog Cotton also have frequent *Sphagnum* spp. cover, but these tended to be mainly hummocks of *S. subnitens* and *S. palustre*, and more typical poor fen species such as Bottle Sedge were also present (*S. cuspidatum* was absent).

Two old railway embankments and associated access routes run in a north south direction through the site. These routes are clearly visible as they are generally raised above the level of the surrounding areas of the site and are largely vegetated by dry grassland. They are still used for access around the site. The grassland is typical of gDa-An but is somewhat better developed and is typical of roadside vergers (GS2). The vegetation is dominated by Cocksfoot. There are sections with large patches of Rose-bay Willowherb, Nettles or Bramble, which are invading from the adjacent scrub. There are also sections with elements of dry calcareous grassland (gCal). At the base of these embankments and along some of the other access routes there is transition to more acidic grassland dominated by Purple Moorgrass, although this is generally never extensive.

Old drainage systems are still in place although these drainage systems appear to be breaking down; as a result the drains appear to be developing a more naturalised appearance with pools and areas where the steep banks have fallen away. Many of the deep drains are quite silted up and have poor development of aquatic communities. These old drainage ditches, for the most part, contain dense scrub and appear to have been the first areas on the site to become vegetated. The woodland appeared to be oldest along the ditches with woodland spreading outwards from the drains.

A large area of raised bog (PB1) is located at the southern end of the site adjacent to the access point. This bog had been burnt recently and was badly damaged. The majority of the drier margins were dominated by bare peat (> 50% cover) with frequent Deergrass and re-growing Heather, Bog Asphodel and Bog Cottons. Hummocks of *S. capillifolium*, *S. papillosum* and *S. subnitens* are all present. The topography of the bog slopes down towards a basin in the central zone. This area was surprisingly still quite wet and spongy/sub-quaking with some extensive *Sphagnum* cover, including lawns of *S. magellanicum* and *S. cuspidatum*. The hummock structure has been damaged by the fire but the *Sphagnum* cover is up to 100% in places. Drains are infilling in and around this zone. This section could be classified as 'active raised bog'. High bog to the south of the track at this point is much drier, as it has been affected by private sod-peat cutting and drainage by Bord na Móna in the past.

The northern and north western section of the site contains an area of remnant raised bog (PB1), this area does not appear to have been cut over and contained some wet areas with *Sphagnum* cover (*Sphagnum cuspidatum*, *S. subnitens* and *S. magellanicum*). Lodgepole Pine seedlings were rapidly becoming established on the areas of high bog. Immediately to the south of the area of raised bog an area of old cutover bog exists. This area was completely revegetated apart from some areas of open water and contained poor fen (pJeff and pRos). It is worth noting that some small sections in this area contained *Sphagnum* cover. Another smaller section of remnant raised bog was located along the eastern edge of the site. This area was dry and degraded and did not contain any wet areas.

The cutover bog (PB4) areas are characterised by bare peat where they are in active use. Some fields have been used more recently but are not used at present and therefore have more typical pioneer poor fen vegetation. This vegetation community is also associated with some sections of the cutaway that have been disturbed more recently by private peat cutting.

<p>Designated areas on site (cSAC, NHA, pNHA, SPA other)</p> <p>None</p>
<p>Adjacent habitats and land-use</p> <p>Adjacent habitats include conifer plantations, agricultural grasslands, Birch woodland, raised bog and residential properties.</p>
<p>Watercourses (major water features on/off site)</p> <ul style="list-style-type: none"> • The Fear English River flows along the western edge of the site in a south - north direction. • A smaller tributary of the Blackwater River begins on the site and flows out of the site at its eastern side. This watercourse is not clearly viable on the site and has likely been diverted into a drainage ditch. • This bog is located within the Boyne catchment and all watercourses on or next to the site flow into the Boyne catchment.
<p>Peat type and sub-soils</p> <p>The majority of the bog still has more acidic bog peat present. There is no exposure of sub-soil at this site.</p>
<p>Fauna biodiversity</p> <p>Bird species</p> <p>Several bird species were noted on the site during the survey.</p> <p>A variety of birds were observed using the site including the following :</p> <ul style="list-style-type: none"> • Kestrel • Grey Heron (2) • Willow Warbler (frequent) in scrub/woodland • Gold Finch (several groups 5-10) using scrub • Redpoll (5) (using scrub) • Meadow Pipit (6) • Chaffinch (2) • Grasshopper Warbler (2) • Buzzard (1) • Mallard (6) (Several pairs using riparian areas). • Snipe (2) (on high bog) • Skylark (2) (on high bog). • Moorhen (1) (in wetland). • Other more common birds including Robin, Wren, Grey Crow, Blackbird, Blue Tit, Grey Crow, Wood Pigeon, Swallow and Pheasant also noted. <p>Mammals</p> <ul style="list-style-type: none"> • Hares are common on the site.

- Pine Marten tracks and scats were recorded.
- Badger tracks noted and signs of foraging in some woodland.
- Fox scats were noted.
- Deer tracks were noted.

Site visit 24/06/2010

Additional species recorded during this visit included

- Water Rail (in small base-rich wetland)
- Cuckoo
- Whitethroat

Activities on the site

Activities on the site include:

- Widespread sod-peat cutting. Seven different tractors or diggers were working on the site in separate locations at the time of the survey. Some diggers were being served by several tractors and trailers. Peat was being dug from face-banks and sods were laid out using sausage machines. There has also been increased access to parts of the site with newly created or bull-dozed tracks to more easily access other areas for peat cutting. There were signs of drainage works associated with this peat cutting and attempts may have been made to let water off from the wetlands along the railway embankment.
- There are been some recent felling of trees/woodland for timber, probably as fuel. This activity was not extensive, although it may become more widespread in the future as the woodlands mature.
- Some of the site has been burnt in the recent past.
- The site is also used for horse-riding and by dog-walkers.

References

European Commission (1996). Interpretation manual of European Union habitats. Brussels. European Commission, DGXI.

Fossitt, J. (2000). A guide to habitats in Ireland. Kilkenny. The Heritage Council.

HABITAT DESCRIPTIONS

(See Habitats Description Document for detailed description of each vegetation community not described in this section.)

Appendix II. Codes used for habitat classification.

Bord na Moña habitat classification scheme

	General	Habitat ¹	BnM habitat code	Equivalent Heritage Council codes ²
Pioneer habitats of industrial cutaway	Peatland	Bare peat (0-50% cover)	BP	ED2
		Embryonic bog community (containing <i>Sphagnum</i> and Bog Cotton)	PBa	PB
		Embryonic bog community (Calluno-Sphagnion)	PBb	PB
	Flush and Fen	Pioneer <i>Campylopus</i> -dominated community	pCamp	PF2
		Pioneer <i>Juncus effusus</i> -dominated community (Soft Rush)	pJeff	PF2
		Pioneer <i>Eriophorum angustifolium</i> -dominated community (Bog Cotton)	pEang	PF2
		Pioneer <i>Juncus bulbosus</i> -dominated community (Bulbous Rush)	pJbulb	PF2
		Pioneer <i>Triglochin palustris</i> -dominated community (Marsh Arrowgrass)	pTrig	PF2
		Pioneer Caricion davallianae-Community with <i>Cladium</i> (rich fen)	pCladium	PF1
		Emergent communities	Pioneer <i>Carex rostrata</i> -dominated community (Bottle Sedge)	pRos
	Pioneer <i>Phragmites australis</i> -dominated community (Common Reed)		pPhrag	FS1
	Pioneer <i>Typha latifolia</i> -dominated community (Reedmace)		pTyp	FS1
	Pioneer <i>Schoenoplectus lacustris</i> -dominated community (Bulrush)		pSch	FS1
	Open water	Charaphyte-dominated community	pChar	FL2
		Permanent pools and lakes	OW	FL2
		Temporary open water	tOW	
	Woodland and scrub	Emergent <i>Betula/Salix</i> -dominated community (A) (Birch/Willow)	eBir	WS1
		Open <i>Betula/Salix</i> -dominated community (B) (Birch/Willow)	oBir	WS1
		Closed <i>Betula/Salix</i> -scrub community (C) (Birch/Willow)	cBir	WS1
		<i>Ulex europaeus</i> -dominated community (Gorse)	eGor	WS1
		<i>Betula/Salix</i> -dominated woodland (Birch/Willow)	BirWD	WN7
	Heathland	Pioneer dry <i>Calluna vulgaris</i> -dominated community (Heather)	dHeath	HH1
		Dense <i>Pteridium aquilinum</i> (Bracken)	dPter	HD1
	Grassland	Pioneer dry calcareous and neutral grassland (Centaureo-Cynosuretum)	gCal	GS1
		<i>Dactylis-Anthoxanthum</i> -dominated community (Cocksfoot-Sweet Vernalgrass)	gCo-An	GS2
		<i>Anthoxanthum-Holcus-Equisetum</i> community (Sweet Vernalgrass-Yorkshire Fog-Horsetail)	gAn-H-Eq	GS
		<i>Molinia caerulea</i> -dominated community (dry) (Purple Moorgrass)	gMol	GS4
		Marsh (Meadowsweet and other tall herbs) (<i>Filipendulion ulmariae</i>)	Mar	GM1
	Disturbed	<i>Tussilago farfara</i> -dominated community (vegetation > 50%) (Colt's Foot)	DisCF	ED3
		<i>Epilobium</i> -dominated community (vegetation > 50%) (Willowherb spp.)	DisWil	ED3
General	Riparian areas (streams or drain with associated edge habitats (e.g. FW2/4 + WS1, GS2 etc)	Rip	FW2 +	
	Silt Ponds (artificial ponds with associated bank habitats (e.g. FL8 + WS1, GS2, ED2, ED3)	Silt	FL8 +	
	Access (tracks or railways with associated edge habitats (e.g. BL3 + gCal, gMol, eGor etc)	Acc	BL3 +	
	Works areas (predominately built land but can include landscaped and brownfield habitats (e.g. GA2, WS3, WD4, ED2, ED3)	Works	BL3 +	

¹ These are generally pioneer habitats of bare peat and the communities can contain a significant proportion of bare peat. Some habitats are more developed than others. They frequently occur in mosaic with each other.

² Not all these communities are equivalent to habitat classes used by The Heritage Council habitat classification scheme (Fossitt 2000) as some are quite rudimentary and undeveloped.

Heritage Council habitat classification scheme (Fossitt 2000)

	General	Habitat	Heritage Council code
Semi-natural and modified habitats	Peatlands	Raised Bog	PB1
		Lowland Blanket bog	PB3
		Cutover Bog	PB4
		Rich fen and flush	PF1
		Poor fen and flush	PF2
		Transition mire and quaking bog	PF3
	Woodland and scrub	Oak-Birch-Holly woodland	WN1
		Oak-Ash-Hazel woodland	WN2
		Wet Pendunculate Oak-Ash woodland	WN4
		Riparian Woodland	WN5
		Wet Willow-Alder-Ash woodland	WN6
		Bog woodland	WN7
		Mixed broad-leaved woodland	WD1
		Mixed broad-leaved/conifer woodland	WD2
		Conifer plantation	WD4
		Scrub (Gorse)	WS1
		Emergent Betula-dominated community	WS1
		Closed Betula scrub community	WS1
		Recently-planted woodland	WS2
		Ornamental scrub	WS3
	Short-rotation coppice	WS4	
	Recently-felled woodland	WS5	
	Linear woodland	Hedgerow	WL1
		Treeline	WL2
	Grasslands and Marsh	Improved grassland	GA1
		Amenity grassland	GA2
		Dry calcareous and neutral grassland	GS1
		Dry meadows and grassy verges	GS2
		Dry-humid acid grassland	GS3
		Wet grassland	GS4
	Freshwater Marsh	GM1	
	Heath and Bracken	Dry Heath	HH1
		Dry calcareous Heath	HH2
		Wet Heath	HH3
		Dense Bracken	HD1
	Disturbed ground	Exposed sand, gravel or till	ED1
		Spoil and bare ground	ED2
		Recolonising bare ground	ED3
		Active quarry	ED4
	Freshwater	Acid Oligotrophic lakes	FL2
		Mesotrophic lakes	FW4
Artificial ponds (slit ponds)		FL8	
Depositing rivers		FW2	
Canals		FW3	
Drains		FW4	
Cultivated and Built land	Stonewalls and other stonework	BL1	
	Earth Banks	BL2	
	Buildings and artificial surfaces	BL3	
	Arable crops	BC1	
	Horticulture	BC2	
	Tilled land	BC3	