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Appendix 1

Previous ecological reports referred to in the Ecological Impact Assessment :

M74 Heat and Power Park, National Vegetation Classification Survey and GWDTE Appraisal March 2017

M74 Heat and Power Park, Preliminary Ecological Appraisal (PEA) - Protected Species including Bats March 2017

M74 Heat and Power Park

National Vegetation Classification Survey and GWDTE Appraisal

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EXECUTIVE SUMMARY

MacArthur Green was commissioned by 3R Energy to conduct and report on National Vegetation Classification (NVC) surveys at the proposed M74 Heat and Power Park by Coalburn, South Lanarkshire (hereafter referred to as the 'Site'). The Site has been subject to extensive opencast coal mining in the recent past and, although now restored, the Site displays many brownfield characteristics.

The aim of the NVC survey is to identify and map the vegetation communities present within the Site in order to identify those areas of greatest ecological interest i.e. potential Groundwater Dependent Terrestrial Ecosystems (GWDTE). This information is used to inform a Preliminary Ecological Appraisal (PEA) for the proposed development options.

The survey was conducted on 17 November 2016 by MacArthur Green. In total 16 NVC communities were recorded at the Site along with various associated sub-communities, however only a small number of communities accounted for the majority of the Site area. The most common and widespread, making up the bulk of the landscape, are *MG9 Holcus lanatus – Deschampsia cespitosa* grassland and M23 *Juncus effusus/acutiflorus – Galium palustre* rush-pasture. These communities often form mosaics with each other or with a number of other less well represented mire communities, these being M15 *Trichophorum germanicum – Erica tetralix* wet heath and M25 *Molinia caerulea – Potentilla erecta* mire. M6 *Carex echinata – Sphagnum fallax/denticulatum* mire appears in a single isolated area. Small areas of dry heath are also present in the form of H9 *Calluna vulgaris – Deschampsia flexuosa* heath.

Calcifugous and mesotrophic grasslands cover substantial areas of the Site on thinner peats and shallow acid to neutral base-poor mineral soils. The most common acidic grassland on Site is the U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland followed by U5 *Nardus stricta – Galium saxatile* grassland. Damp neutral soils on Site are generally characterised by the MG10 *Holcus lanatus – Juncus effusus* rush-pasture.

Woodland communities are scarcer, with W18 *Pinus sylvestris – Hylocomium splendens* woodland being the most common; with much more isolated and fragmented communities of W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* woodland, W11 *Quercus petraea – Betula pubescens – Oxalis acetosella* woodland, and W17 *Quercus petraea – Betula pubescens – Dicranum majus* woodland. Two isolated patches of scrub appear in the form of W23 *Ulex europaeus – Rubus fruticosus* scrub and W24 *Rubus fruticosus – Holcus lanatus* underscrub. There is also a single area of S12 *Typha latifolia* swamp.

The NVC surveys have indicated the presence of potential GWDTE habitats within the Site. These habitats have however been further assessed based on the underlying hydrogeology and historic land use, and, are not assessed as being truly groundwater dependent in this setting.

1. INTRODUCTION

MacArthur Green was commissioned by 3R Energy to carry out a National Vegetation Classification (NVC) survey at the M74 Heat and Power Park, near Coalburn, approximately 1.7km north-west of Douglas (hereafter referred to as the 'Site'). The Site has been subject to extensive opencast coal mining in the recent past and, although now restored, the Site displays many brownfield characteristics.

The aim of the NVC survey is to identify and map the vegetation communities present within the Site in order to identify those areas of greatest ecological interest and potential Groundwater Dependent Terrestrial Ecosystems (GWDTE)[1].

This report details the findings of the NVC surveys together with an evaluation of those communities described including an assessment of their likely groundwater dependency.

2. THE SITE AND STUDY AREA

The Site extends across an area formerly used for opencast coal mining. The Poniel Water flows along part of the northern Site boundary with tributaries flowing into the watercourse from the south and south-west. A former dismantled railway line runs along the inside of the eastern Site boundary. The dominating habitats are a mix of marshy grassland and pasture and semi-improved acid grassland. Coniferous and broadleaved woodland feature along the northern and eastern areas of the Site. The Site reaches an elevation of 250m AOD to the west of Alder Burn. The NVC survey focussed on mapping the habitats within the planning application boundary and appropriate buffer areas where direct land access was possible. The area covered by NVC surveys is hereinafter referred to as the 'study area' (see Figure 1).

3. METHODOLOGY

The vegetation was surveyed by a suitably qualified and experienced botanical surveyor using the NVC scheme (Rodwell, 1991-2000; 5 volumes) and in accordance with NVC survey guidelines (Rodwell, 2006). The NVC scheme provides a standardised system for classifying and mapping semi-natural habitats, and ensures that surveys are carried out to a consistent level of detail and accuracy.

Homogenous stands and mosaics of vegetation were identified and mapped by eye, and drawn as polygons on high resolution aerial imagery field maps. These polygons were surveyed qualitatively to record dominant and constant species, sub-dominant species and other notable species present. The surveyors worked progressively across the study area to ensure that no areas were missed and that mapping was accurate. NVC communities were attributed to the mapped polygons using surveyor experience and matching field data against published floristic tables (Rodwell, 1991-2000). Stands were classified to sub-community level where possible, although in many cases the vegetation was mapped to community level only because the vegetation was too species-poor or patches were too

[1] As defined within SEPA (2014). Guidance Note 31: Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Available for download from http://www.sepa.org.uk/media/143868/lupsgu31_planning_guidance_on_groundwater_abstractions.pdf.

small to allow meaningful sub-community determination; or because some areas exhibited features or fine-scale patterns of two or more sub-communities.

Quadrat sampling was not used in this survey because experienced NVC surveyors do not necessarily need to record quadrats in order to reliably identify NVC communities and sub-communities (Rodwell, 2006). Notes were made about the structure and flora of larger areas of vegetation in many places (such as the abundance and frequency of species, and in some cases condition and evident anthropogenic impacts). It can be better to record several larger scale qualitative samples than one or two smaller quantitative samples; furthermore, qualitative information from several sample locations can be vital for understanding the dynamics and trends in local (study area) vegetation patterns (Rodwell, 2006).

Due to small scale vegetation and habitat variability and numerous zones of habitat transition between similar NVC communities, many polygons represent complex mosaics of two or more NVC communities. Where polygons have been mapped as mosaics an approximate percentage cover of each NVC community within the polygon is given so that the dominant community and character of the vegetation could still be ascertained.

Botanical nomenclature in this report follows that of Stace (2010) for vascular plants and Atherton *et* al (2010) for bryophytes.

4. SURVEY CONSTRAINTS

All areas of the study area were accessible during the survey.

While the survey was conducted in November, being outside the optimal time of year for vegetation surveys, the types of grassland, mire and heath present could still be reliably identified despite the time of year, given the persistence of readily recognisable perennial vegetation, sub-shrubs and mosses. This constraint is not considered to affect the validity of the survey results, or the robustness of any assessments made from these data.

The NVC system does not cover all possible semi-natural vegetation or habitat types that may be found. Since the NVC was adopted for use in Britain in the 1980s further survey work and an increased knowledge of vegetation communities has led to additional communities being described that do not fall within the NVC system. Where such communities are found and recorded they are given a non-NVC community code and are described.

It should be noted that the results from this survey, and the matches made in describing communities, represent a current community evaluation at the time of survey (as opposed to one seeking to describe what the community was before any human interference, or what it might become in the future). In light of this, a clear constraint of the vegetation survey and evaluation process as used in this and other surveys is that it offers only a snapshot of the vegetation communities present and should not be interpreted as a static long term reference.

5. NVC SURVEY RESULTS AND VEGETATION DESCRIPTIONS

Summary of NVC Communities

The categories of vegetation within the Site include the following 16 NVC communities recorded during the survey:

1. Mires and flushes: M6, M23, M25
2. Wet heaths: M15
3. Dry heaths: H9
4. Grasslands: U4, U5, MG9, MG10
5. Woodland and scrub: W7, W11, W17, W18, W23, W24
6. Swamp and tall-herb fens: S12

The following sections describe the flora, structure and habitats of these communities and any associated observed sub-communities, as found within this study area. For each NVC community description, the first paragraph refers to the community in Britain or Scotland as a whole, before moving on to the other paragraphs which describe the vegetation as it was found to occur within this study area. The NVC communities within each broad habitat type (e.g. woodland) are described in order of community number within the study area.

The survey results are displayed in Figure 1. A number of target notes were also made during surveys, often to pinpoint areas or species of special interest. These target notes are shown in Figure 1 and detailed within Annex A, target note photographs are included within Annex B. Further photographs of a number of the typical habitat types found within the study area are provided within Annex C.

Mires and Flushes

M6 Carex echinata - Sphagnum fallax/denticulatum mire

Communities/sub-communities recorded: M6d

This mire is the major soligenous community of peats and peaty gleys irrigated by base poor waters in the sub-montane zone of northern and western Britain. It typically occurs as small stands among other mire communities, grasslands and heaths, and is sometimes found with swamp and spring vegetation. It is commonly found in tracts of unenclosed pasture on upland fringes, particularly between 200 m and 400 m (although it may also be found much higher) and is ubiquitous in the upland fringes of Britain (Rodwell *et al* 1991; Elkington *et al* 2001). The M6 community has a distinct general character but includes a wide variation in species composition, expressed as four sub-communities (two of which are visually similar to the M23 community). It is essentially a poor-fen with small sedges or rushes dominating over a carpet of oligotrophic and base-intolerant *Sphagna* (Rodwell *et al* 1991; Elkington *et al* 2001).

This community appears in a single location within the south-west of the study area. *Juncus acutiflorus* dominates this sward within the M6d *Juncus acutiflorus* sub-community present, with the appearance of occasional *J. bulbosus* and *Molinia caerulea*. While herbs were found to be lacking the moss *Polytrichum commune* is abundant along with the *Sphagnum* mosses *Sphagnum palustre* and *S. fallax*.

M23 Juncus effusus/acutiflorus – Galium palustre rush-pasture

Communities/sub-communities recorded: M23, M23a, M23b

This rush-pasture is a community of gently-sloping ground in and around the margins of soligenous flushes, as a zone around topogenous mires and wet heaths, and in poorly drained, comparatively unimproved or reverted pasture. It can be found on a variety of moderately acid to neutral soils that are kept moist to wet for most of the year (Rodwell *et al* 1991; Elkington *et al* 2001). As a result, this community can be, at least partially, potentially dependent on groundwater; however, it is also commonly associated with surface water flows and surface water collection. This vegetation is characterised by the abundance of either *Juncus effusus* or *J. acutiflorus* (sometimes both), with a ground layer of mesophytic herbs common in moist or permanently wet grasslands; associates are quite diverse. Acidophilous *Sphagna* and *Polytrichum commune* are rare in the M23 community (Averis *et al* 2004).

The M23 community is common throughout the study area, being found both in mosaics with other communities and as pure stands of M23. Within the study area the community often appears in close proximity to watercourses or poorly drained areas, often as a result of the surrounding topography. *J. effusus* and/or *J. acutiflorus* dominate the sward in most cases.

Other species frequently found within this community in the study area include *Molinia caerulea*, *Agrostis sp.*, *Holcus lanatus*, *H. mollis* and *Deschampsia cespitosa*. Other species more occasional in the sward include *Potentilla erecta*, *Galium saxatile*, *Cirsium palustre*, *Ranunculus repens*, *Viola palustris*, *Luzula multiflora*, *Filipendula ulmaria*, and *Plantago lanceolata*. Bryophyte cover is abundant in certain areas with *Rhytidiadelphus squarrosus*, *Pleurozium schreberi*, and *Aulacomnium palustre*.

Both sub-communities are present and appear in a number of mosaics across the study area. M23a is the richer more diverse sub-community dominated by *J. acutiflorus*, with M23b being more species poor with fewer forbs.

M25 Molinia caerulea – Potentilla erecta mire

Communities/sub-communities recorded: M25, M25a

M25 mire is a community of moist, but usually well aerated, acid to neutral peats and peaty soils (Rodwell *et al* 1991). It generally occurs over gently-sloping ground, marking out seepage zones and flushed margins of topogenous mires, but also extends onto the fringes of ombrogenous mires (Rodwell *et al* 1991; Elkington *et al* 2001; Averis *et al* 2004). *Molinia caerulea* is the most abundant species found in this community. The associated flora is usually species-poor, and consists largely of *Juncus* spp. and a few dicotyledons. Occasionally sub-shrubs can be quite common, particularly *Calluna vulgaris* and *Erica tetralix*. *Myrica gale* is local but can be quite extensive and dense in co-dominance with *M. caerulea*. Treatments such as burning, grazing and drainage are likely to be largely

responsible for the development of this community over ground that would naturally host some other kind of mire or wet heath vegetation (Rodwell *et al* 1991; Elkington *et al* 2001).

The M25 community appears in various mosaics in the study area, with other mire and grassland communities M23, MG9, U4, U5 and the heath community H9. A single pure stand of M25 can be found within the north of the study area.

M. caerulea dominates the vegetation strongly, often limiting the variety of species present. The more mire like M25a *Erica tetralix* sub-community present contains *C. vulgaris*, *E. tetralix* and *Vaccinium myrtillus*. *Galium saxatile* is also abundant within these areas along with the mosses *Pleurozium schreberi* and *Polytrichum commune*.

Wet Heaths

M15 Trichophorum germanicum – Erica tetralix wet heath

Communities/sub-communities recorded: M15

This wet heath community is characteristic of moist and generally acid and oligotrophic peats and peaty mineral soils in the wetter western and northern parts of Britain. It is also associated with thinner or better drained areas of ombrogenous peat (Rodwell *et al* 1991; Elkington *et al* 2001). It is a vegetation type with few constant species and wide variation in its flora and dominant species. *Calluna vulgaris*, *Molinia caerulea*, *Trichophorum germanicum* and *Erica tetralix* are usually all of high frequency, and it is mixtures of these species that give the vegetation its general character. However sometimes one or two of them may be missing and their relative proportions can be very diverse (Rodwell *et al* 1991; Elkington *et al* 2001). The shrubby species *Erica cinerea*, *Vaccinium myrtillus* and *Myrica* gale are important in particular sub-communities. Other species found commonly in M15 are *Potentilla erecta*, *Polygala serpyllifolia*, *Narthecium ossifragum* and *Eriophorum angustifolium*. By contrast *E. vaginatum* is notably scarce. M15 is generally an extremely variable community in terms of dominants, constants and co-dominants, which can vary markedly over short distances. Grazing and burning have important effects on the floristics and structure of this community, and draining and peat-cutting have extended its coverage to formerly deeper and wetter peats in which blanket mire communities (i.e. M17-M19) were initially present (Rodwell *et al* 1991; Elkington *et al* 2001).

M15 *Trichophorum germanicum* - *Erica tetralix* wet heath is infrequently present appearing in two locations. There is a pure stand of M15 in the south west corner of the study area and the second stand forms part of a mosaic with other grassland communities; MG9 and U4 within the north east. In these areas of M15, *T. germanicum* dominates small patches within areas of equally abundant *M. caerulea* and *Juncus squarrosus*. *Calluna vulgaris* is occasional along with *E. tetralix* and *Vaccinium myrtillus*. A variety of pleurocarpous mosses can be found with *Pleurozium schreberi*, *Hypnum jutlandicum*, and *Rhytidiadelphus squarrosus*. Within the wetter areas of this community the *Sphagnum* mosses *Sphagnum capillifolium*, *S. papillosum*, and *S. palustre* are present within the basal layer.

Dry Heaths

H9 Calluna vulgaris – Deschampsia flexuosa heath

Communities/sub-communities recorded: H9, H9c

This heath is a characteristic sub-shrub vegetation of acid and impoverished soils at low to moderate altitudes. It is normally found on very base-poor soils, highly oligotrophic and at least moderately free-draining, often excessively so, which have been derived from a wide variety of parent materials (Rodwell *et al* 1991; Elkington *et al* 2001). The cool and wet climate has some influence on the floristics of this community, but much of its character derives from a combination of frequent burning and grazing. *Calluna vulgaris* is typically the most abundant plant in this community, often forming a fairly low and open canopy. No other sub-shrubs are consistently frequent throughout, although some can be quite common and locally abundant. The only other vascular constant is *Deschampsia flexuosa*, although even in open *Calluna* it often occurs only as sparse tufts, and under dense canopies it can almost disappear. Other herbs are also few and are of low cover. Bryophytes and lichens are rarely abundant and associated species diversity is low (Rodwell *et al* 1991; Elkington *et al* 2001).

This dry heath community appears both as a single stand and as part of a mosaic. The H9c sub-community is found along sloping ground in the east of the study area along the edge of the dismantled railway line or along road verges. There is an almost complete abundance of *C. vulgaris* with the occasional stems of *Deschampsia flexuosa* appearing through its dense canopy. This community also forms mosaics with both the mire and grassland communities M23, M25, MG9 and U4.

Calcifugous Grasslands

U4 Festuca ovina – Agrostis capillaris – Galium saxatile grassland

Communities/sub-communities recorded: U4, U4b, U4d

The U4 *Festuca ovina - Agrostis capillaris - Galium saxatile* grassland is a form of predominately upland grassland of well-drained, acidic and base-poor mineral soils throughout the wet and cool regions of north-west Britain where it dominates extensive areas of pastureland (Rodwell *et al* 1992; Cooper 1997). Throughout this geographic range the community can often be found forming a distinctive component of larger mosaics of grasslands, heaths, and mires.

U4 grassland communities are generally identified on the presence of an often close-cropped, grass-rich sward dominated by various combinations of *A. capillaris*, *F. ovina* and *Anthoxanthum odoratum*, with *Galium saxatile* and *Potentilla erecta* consistent associates. A well-developed moss layer is also characteristic, but in the U4b sub-community it may be limited by the dense, relatively productive sward of grasses.

This community is found across the northern half of the study area, particularly on better drained slopes with mineral soils. U4 appears in a number of mosaics with mire, grassland and heath communities. *Agrostis* spp. are abundant with other grass species frequent including *Molinia caerulea*, *Holcus lanatus*, *H. mollis* with occasional *Juncus effusus* and *Cynosurus cristatus*. Herbs present in the sward included *Ranunculus repens*, *R. acris*, *Luzula multiflora*, *Cirsium arvense*, *Plantago lanceolata*,

Galium saxatile, *Potentilla erecta*, *Trifolium repens*, and *Rumex acetosa*. *Calluna vulgaris* and *Vaccinium myrtillus* also feature occasionally. Mosses present include *Rhytidiadelphus squarrosus*, *Polytrichum commune*, *Hylocomium splendens* and *Pleurozium schreberi*.

Two U4 sub-communities, U4b *Holcus lanatus - Trifolium repens* sub-community and U4d *Luzula multiflora – Rhytidiadelphus loreus*, were recorded within the study area, mainly around the open semi-improved grassland within the north east of the study area. The U4b sub-community is distinguished by the abundance of *H. lanatus* within the sward.

The community is intensively grazed by livestock, which helps to maintain its close-cropped sward.

U5 Nardus stricta – Galium saxatile grassland

Communities/sub-communities recorded: U5

U5 grassland tends to be found on damp mineral soils which have peaty upper horizons. U5 typically occupies slopes where the depth and wetness of the soil are intermediate between those of the drier podsols under U4 grasslands and wet shallow peats found under U6 grassland. The underlying rock can be anything from acid to basic, but the soils are generally acidic (Rodwell *et al* 1992; Averis *et al* 2004). U5 is common on the higher hill slopes of the cool, wet north and west of Britain (Rodwell *et al* 1992; Cooper, 1997). It is also commonly found on well-drained but moist alluvial soil along the margins of streams (Averis *et al* 2004).

The U5 community is found within mosaics across the study area within a number of mainly grassland mosaics and occasional mire communities.

Typically, *Nardus stricta* dominates within the areas of U5, along with other frequent grassland associates of *Agrostis sp*., *Juncus squarrosus*, *Deschampsia flexuosa* and *Potentilla erecta*. The mosses *Dicranum scoparium, Pleurozium schreberi* and *Hylocomium splendens* are also frequently present.

Mesotrophic Grasslands

MG9 Holcus lanatus – Deschampsia cespitosa grassland

Communities/sub-communities recorded: MG9

MG9 *Holcus lanatus – Deschampsia cespitosa* grassland is characteristic of permanently moist, gleyed and periodically inundated circumneutral soils across large areas of the British lowlands. It can exist on level to moderately sloping ground in areas of pasture or meadow, but can also be found along woodland rides and fen/wetland margins. MG9 typically contains a coarse and tussocky sward dominated by *D. cespitosa* (Rodwell *et al* 1992; Cooper, 1997).

The MG9 community is one of the most abundant communities found across the study area. The community appears both as pure stands and within mosaics (see Annex 3, Photo 3-2) with other grassland, mire and woodland communities. *D. cespitosa* displays a competitive advantage, helped by grazing livestock, over most other species shown by its complete abundance in many areas together with the lack of any significant species diversity. It is usually found within marshy areas and, in this case, in areas that have been bare ground that has since re-colonised. The other characteristic species are also present with *Holcus lanatus*, *Agrostis sp*., *Ranunculus repens*, and *Cirsium arvense*. Bryophyte

coverage was limited with occasional patches of *Rhytidiadelphus squarrosus*. These areas were found to be species poor, often in close proximity to watercourses or areas that have re-vegetated from being bare ground.

MG10 Holcus lanatus – Juncus effusus rush-pasture

Communities/sub-communities recorded: MG10a

MG10 is a form of rush-pasture characteristic of areas with strongly impeded drainage over a wide range of usually acid to neutral mineral soils on level to gently sloping ground (Rodwell *et al* 1992; Cooper, 1997). This community requires consistently high soil moisture (Rodwell *et al* 1992). It occurs across most of the British lowlands, with the typical sub-community being particularly prominent towards the north and west. Although found on various soil types including brown earth and calcareous earth throughout its range, this habitat can also have close associations with various types of mire vegetation and can form significant parts of rush-dominated mire mosaics in areas of suitably moist soils.

The MG10 community appears twice within the study area found in mosaics with the other grassland communities MG9 and U4. Both locations are concentrated along the western boundary where grazing is more intensive. The Typical sub-community MG10a is present with the key species *J. effusus* and *H. lanatus* being co-dominant. The species composition of this community is poor with occasional *Rumex acetosa*, occasional *Agrostis sp*., and the mosses *Brachythecium rutabulum* and *Kindbergia praelonga*.

Woodland and Scrub

W7 Alnus glutinosa – Fraxinus excelsior – Lysimachia nemoreum woodland

Communities/sub-communities recorded: W7

W7 is typical of moist to very wet mineral soils which are only moderately base-rich and not very eutrophic (Rodwell *et al* 1991; Hall *et al* 2004). It is most extensive in the wetter parts of Britain, but usually occurs in soils where there is no great tendency for peat accumulation. *Alnus glutinosa* is the main tree species, and is commonly accompanied by other species such as *Fraxinus excelsior*, *Betula* spp., *Salix* spp. and *Acer pseudoplatanus*. The field layer can be very varied; the wetness and nutrient status of the soil determines what other species may occur, these being mainly grasses and herbaceous dicotyledons (Rodwell *et al* 1991; Hall *et al* 2004). There are three sub-communities; differences between them are related to the extent of waterlogging, the nature of the water supply and its movement.

Two stands of woodland most closely resembling W7 are found within the north of the study area along the slopes between the access track and the Poniel Water. Young planted *Betula sp*. is the most abundant species with the occasional *Alnus glutinosa* and *Pinus sylvestris*. The second stand is located beside the track along the edge of the Alder Burn within the central area of the study area with an open canopy of *Salix cinerea*. Both woodland stands form mosaics with the other grassland and mire communities of U4, M23b and MG9. Both stands contain an understorey of abundant *Juncus effusus*, *Deschampsia cespitosa*, *Holcus lanatus*, *Agrostis sp*., *Ranunculus repens* and *Cirsium palustre*. *Filipendula ulmaria* was occasional.

W11 Quercus petraea – Betula pubescens – Oxalis acetosella woodland

Communities/sub-communities recorded: W11

W11 is a community of moist, free-draining base-poor brown earth soils in the cooler, wetter north-west of Britain. It is characteristic of substrates that are neither markedly calcareous nor strongly acidic. The character of the community is often heavily influenced by grazing (Rodwell *et al* 1991; Hall *et al* 2004). These woodlands have a canopy of *Betula* spp. and/or *Quercus* spp. and a field layer dominated mainly by grasses. The canopy composition reflects its affinities with the W17 *Quercus petraea – Betula pubescens – Dicranum majus* community, and from which it is distinguished mainly by the swards of grasses including *Agrostis* spp., *Holcus mollis* and *Anthoxanthum odoratum*, rather than one dominated by pleurocarpous mosses, sub-shrubs and *Deschampsia flexuosa*.

This woodland community is found within two locations in the south-east area of the study area. Both woodland stands are small with one following the edge of the dismantled railway line. Both of these woodland areas are dominated by *Betula pendula* with a grassy understorey of *Agrostis sp*., *Holcus lanatus* and *Dactylus glomerata* in addition to the herbs *Potentilla erecta* and *Galium saxatile*. Due to the woodland areas being so small they were mapped to a community level only.

W17 Quercus petraea – Betula pubescens – Dicranum majus woodland

Communities/sub-communities recorded: W17

W17 *Quercus petraea – Betula pubescens – Dicranum majus* woodland is a community of very acid, often thin and fragmentary soils in the cool, wet north-west of Britain where there is a strong tendency for mor accumulation and where high rainfall leads to strong leaching (Rodwell *et al* 1991; Hall *et al* 2004). Local differences in climate and topography have a strong influence on the vegetation and frequently interact with grazing to determine the distinctive floristics of the sub-communities (Rodwell *et al* 1991). In this community *Quercus petraea* and/or *Betula pubescens* usually dominate although *B. pubescens* is particularly frequent to the north-west where *Quercus* spp. are scarce. The field layer is usually characterised by ericoid shrubs, *Pteridium aquilinum* and grasses; bryophytes are also particularly abundant within this community (Rodwell *et al* 1991; Hall *et al* 2004).

A single stand of this community can be found along the south eastern boundary of the study area. The community lies within a mosaic, dominating over the other grassland and mire communities (see Annex 3, Photo 3-4). The canopy layer consists of co-dominant *B. pubescens* and *B. pendula*. The understorey reflects a more heathy mix of *Molinia caerulea* and *Calluna vulgaris* along with the mosses *Hylocomium splendens*, *Hypnum jutlandicum* and *Polytrichum commune*.

W18 Pinus sylvestris – Hylocomium splendens woodland

Communities/sub-communities recorded: W18

W18 *Pinus sylvestris – Hylocomium splendens* woodland is generally a community of strongly leached, lime-free, podzolic soils in the central and north-western highlands of Scotland. Variation in composition is generally related to the density and age of the pine canopy, but climate, soils and the

incidence of browsing, grazing and burning are also important. *P. sylvestris* is always the most abundant tree, though *Betula* spp. may be common. There is a heathy field layer and bryophytes are dominant (Rodwell *et al* 1991; Hall *et al* 2004).

This community is found in the north of the study area (see Annex 3, Photo 3-3), three stands being pure stands of W18 and one is found within a mosaic with the mire community M23b. *Pinus sylvestris* dominates all of the woodland stands. The field layer consists of abundant *Calluna vulgaris* with *Deschampsia flexuosa* with the mosses *Polytrichum commune* and *Hypnum jutlandicum*. Within the most westerly stand, which incorporates a burial ground, *Picea sitchensis* and *Betula sp*. very occasionally form part of this woodland canopy. The stands, due to their location, are assumed to be of plantation origin as they are outwith the core native range of W18 which is in in the highlands.

W23 Ulex europaeus – Rubus fruticosus scrub

Communities/sub-communities recorded: W23

The W23 community is dominated by *Ulex europaeus* and has a usually sparse and species-poor ground flora which may be totally absent. It is a community of acidic and free draining soils on gentle to steep, rocky slopes at low altitudes. The vegetation often develops after woodland clearance of, or on, abandoned pasture (Rodwell *et al* 1991; Averis *et al* 2004).

W23 was recorded as an isolated patch within the south of the study area, being dominated by *Ulex europaeus* with no other species being recorded due to the its dense coverage of the area.

W24 Rubus fruticosus – Holcus lanatus underscrub

Communities/sub-communities recorded: W24

W24 underscrub is a very typical community of abandoned and neglected ground in the British lowlands where it can be found on a wide variety circumneutral and less oligotrophic soils. It is very common on derelict land and in run-down arable fields, pastures and meadows. It is also frequent along hedgerows and woodland margins (Rodwell *et al* 1991). The community is typically dominated by mixtures of brambles, rank grasses and tall dicotyledons, forming a cover of variable height, but usually less than 1m. *Rubus fruticosus* agg. is a constant component of the vegetation but its abundance can be variable; a rank growth of grasses is also usually a prominent feature of the community (Rodwell *et al* 1991).

One small area of W24 was recorded as part of a mosaic of grassland, mire and heath communities along a sloping embankment above the west side of the Alder Burn within the central study area. The vegetation consisted of the characteristic species *Rubus fruticosus* and *Holcus lanatus*.

Swamps and Tall-Herb Fens

S12 Typha latifolia swamp

Communities/sub-communities recorded: S12a

S12 is most characteristic of standing or slow-moving, mesotrophic to eutrophic, circumneutral to basic waters with silty substrates. It is frequent around lowland lakes ponds and reservoirs and along

canals and sluggish streams. *Typha latifolia* is always dominant in this type of swamp, forming an open or closed cover of shoots usually 1-2m tall.

A single area of swamp is found along the edge of the Alder Burn (see TN3 and Annex 2, Photo 2-2) within the centre of the study area. *T. latifolia* dominates the swamp completely with no other species found, characteristic of the S12a *Typha latifolia* sub-community.

Non-NVC Communities & Categories

Overview

A number of non-NVC vegetation types or features were mapped during the survey. These were classified as follows. Codes used in the results Figure 1 are given in parentheses:

7. Conifer plantation (CP)
8. Bare ground (BG)
9. Building (BD)
10. *Juncus effusus* acid grassland community (JE)
11. Standing water (SW)

The plantation areas were generally unremarkable in terms of their flora and species composition, however, in a few cases a community could be assigned based on the composition of the field layer flora (as described above). In more mature plantations, coniferous ones in particular; there is often no ground flora except some scattered mosses, the ground instead being blanketed in woody debris and conifer needles. These woodland plantation areas, along with areas of bare ground or hard standing (see Annex 3, Photo 3-1), and standing water (see TN1, TN2, and Annex 2, Photo 2-1) are floristically impoverished and of negligible botanical importance.

The other bulleted non-NVC vegetation type JE recorded above is described below.

Juncus effusus (JE) acid grassland communities

The JE acid grassland community is present here as patches of a *Juncus* spp. dominated calcifuge grassland. This is vegetation in which very dominant and tall tussocks of *J. effusus* grow abundantly among a few shorter 'acid grassland' swards including frequent to occasional *Agrostis capillaris*, *Holcus lanatus*, *Rumex acetosa*, *Potentilla erecta* and *Galium saxatile*. This vegetation does not fit into any NVC community as it lacks the wetland element of M6 and M23 *Juncus* spp. mires and has a more acidophilous flora than MG10 *Juncus effusus* rush-pasture; it is therefore classed separately.

This vegetation is of limited botanical interest, but in light of the SEPA classification of potential GWDTEs this non NVC type JE should also be assessed for potential GWDTE status. The classification of moderate sensitivity is in line with other similar *Juncus* spp. dominated grassland communities (e.g. MG10).

6. EVALUATION OF BOTANICAL INTEREST

Overview

NVC communities can be compared with a number of habitat classifications in order to help in the assessment of the sensitivity and conservation interest of certain areas. The following section compares the survey results and the NVC communities identified, against the classification from SEPA guidance on GWDTE.

Groundwater Dependent Terrestrial Ecosystems (GWDTE)

SEPA has classified a number of NVC communities as potentially dependent on groundwater (SEPA, 2014). Wetlands or habitats containing these particular NVC communities are to be considered GWDTE unless further information can be provided to demonstrate this is not the case. Many of the NVC communities on the list are very common habitat types across Scotland, and some are otherwise generally of low ecological value. Furthermore, some of the NVC communities may be considered GWDTE only in certain hydrogeological settings. Using SEPA's (2014) guidance, Table 6-1 shows which communities recorded within the study area may be considered GWDTE. Those communities which may have limited (moderate) dependency on groundwater in certain settings are marked in yellow and NVC communities recorded that are likely to be considered high, or sensitive GWDTE in certain hydrogeological settings are highlighted in red.

Table 6-1 Communities within the study area which may potentially be classified as GWDTE

NVC Code	NVC Community Name
M15	*Trichophorum germanicum – Erica tetralix* wet heath
M25	*Molinia caerulea – Potentilla erecta* mire
MG9	*Holcus lanatus – Deschampsia cespitosa* grassland
MG10	*Holcus lanatus – Juncus effusus* rush pasture
JE[2]	*Juncus effusus* acid grassland
W7	*Alnus glutinosa – Fraxinus excelsior – Lysimachia nemoreum* woodland
M6	*Carex echinata – Sphagnum fallax/denticulatum* mire
M23	*Juncus effusus/acutiflorus – Galium palustre* rush pasture

The location and extent of all identified potential GWDTE are provided on an appropriate NVC map; see Figure 2.

Within Figure 2 the potential GWDTE sensitivity of each polygon containing a potential GWDTE is classified on a four-tier approach as follows:

12. 'Highly – dominant' where potential high GWDTE(s) dominate the polygon

[2] In light of the SEPA classification on potential GWDTEs the non NVC type 'JE' should also qualify for potential GWDTE status. The classification of moderate sensitivity is keeping in line with other similar *Juncus* spp. dominated grassland communities (e.g. MG10).

13. 'Highly - sub-dominant' where potential high GWDTE(s) make up a sub-dominant percentage cover of the polygon
14. 'Moderately – dominant' where potential moderate GWDTE(s) dominate the polygon and no potential high GWDTEs are present
15. 'Moderately - sub-dominant' where potential moderate GWDTE(s) make up a sub-dominant percentage cover of the polygon and no potential high GWDTEs are present

Where a potential high GWDTE exists in a polygon it outranks any potential moderate GWDTE communities within that same polygon.

GWDTE sensitivity has been assigned solely on the SEPA listings (SEPA, 2014). However, depending on a number of factors such as geology, superficial geology, presence of peat and topography, many of the potential GWDTE communities recorded may in fact be only partially groundwater fed or not dependant on groundwater at all. Determining the actual groundwater dependency of particular areas or habitat will requires further assessment (Section 6.3).

Groundwater Dependency

The Site is located within a previously developed opencast mining area. The area has been restored in part, but is not natural. Figures 3 and 4 show the areas of the site which were disturbed by the earlier opencast operations.

A number of NVC polygons within the Site application boundary have been identified as potentially groundwater dependent, in accordance with SEPA listings (Figure 2).

In accordance with SEPA's Land Use Planning System Guidance Note 31 (LUPS31), any potential GWDTE within 100 m of the development have been reviewed to consider their true likely groundwater dependency. This has been based around the following factors:

1. Underlying bedrock and superficial deposits;
2. Historic land-use changes; and
3. Impermeable barriers to flow between the infrastructure and GWDTE.

Underlying Bedrock and Superficial Deposits

The area underlying the Site has been checked against the British Geological Survey GeoIndex[3]. The underlying geology is a combination of upper limestone formation and the passage formation. The bedrock geology is overlain by Till superficial deposits.

The hydrogeology of the underlying bedrock is considered overall to be of moderate productivity. It generally comprises low yields except where disturbed by mining or along the Passage Formation. Where mined the water quality is noted as being of poor quality, often with high iron and floride. Historic mining operations and associated dewatering at the Site, are discussed further in the following section.

[3] British Geological Survey (http://bgs.ac.uk/geoindex/)

Historic Land Use Changes

The Site has been previously developed for open cast mining and formed part of the Dalquhandy Opencast Coal Site which was once the largest opencast in western Europe. The immediate area of the Site was used for the main access, coal processing facilities, coal stocking areas, tailing ponds and settlement lagoons as shown in Figure 4.

Whilst these areas have been stripped of soils and previously excavated (in part) to shallow depth, they have not been quarried or subject to deep excavations.

Groundwater within, and around, the Dalquhandy Opencast Coal Site was dewatered for many years via a series of advanced dewatering borehole abstractions and sump pumping within the various excavation voids. Groundwater flows and volumes in this area have therefore been significantly altered by the previous mining operations.

Excavation of soils and the compaction of ground to form coal stocking and infrastructure areas, as well as the excavation and clay lining of areas for settlement lagoons will have further altered the hydrological regime. Despite areas of the Site having been restored, they remain lower lying than the natural surrounding topography and will collect surface runoff. The introduction of made and compacted ground, will also reduce the potential for further infiltration and connectivity with the lower bedrock.

Impermeable Barriers to Flow

The centre of the Site is characterised by a large area of concrete hardstanding. A dual width, tarmac surfaced access road dissects the Site in two, and disrupts the natural flow paths from higher southern areas to lower northern aspects of the Site. An extensive and established network of drainage arrangements was put in across the Site by the opencast operation to manage surface runoff around the coal infrastructure area, including the main access road. This access road and its substantial construction provides a hydrological barrier to shallow sub-surface movement and rules out the potential for connecting shallow groundwater flows between the northern and southern parts of the Site.

Highly Dominant GWDTE

Potential areas of Highly Dominant GWDTE are located to the south of the access track. The area aligns with that used historically as a coal stocking ground. This area is now lower lying and comprises restored or made ground. The underlying geology in this area is low yielding and doesn't align with the Passage Formation. Furthermore, it may have been affected by historic dewatering. It is therefore considered that this polygon is dependent on surface water which flows towards this now disturbed, lower lying area. It may collect in this area due to the lack of gradient and potentially reduced infiltration capacity of the restored made ground. It is therefore not considered to be a groundwater dependent habitat.

A further potentially Highly Subdominant GWDTE is located on the downslope of the access track closer to the dammed watercourse of Alder Burn. This is associated with surface runoff collection areas and Site drainage and is not considered to be groundwater dependent.

Highly Sub-dominant GWDTE

A potentially Highly sub-dominant GWDTE polygon is located to the south of the southern Site boundary. This area is fed by flows higher in the catchment and will not be affected by the lower development which will require shallow excavation. Furthermore, the habitats are separated by an existing railway line further reducing the potential for hydrological connectivity between these habitats and groundwater in the development area.

A further area of potentially Highly sub-dominant GWDTE polygons are located to the north of the existing hardstanding. This area was historically covered by tailing ponds. This is an area of wet ground which, based on underlying the hydrogeology, has limited capacity for infiltration. The infiltration capacity will have been further reduced by the clay lining of the former tailings lagoons within this part of the site, and, compounded by compaction during restoration and made ground. It is not considered that the habitats reflect an area of groundwater dependency, but rather that of saturated ground, still of poor quality.

Due to the limited groundwater potential at this Site and its heavily disturbed nature, those polygons of Moderate groundwater dependency are not assessed are being truly groundwater dependent, or dependent on flows from the proposed development which is in part, covered by existing hardstanding and remnants of opencast infrastructure.

7. SUMMARY

In total 16 NVC communities were recorded within the study area with a number of associated sub-communities, however only a small number of communities accounted for the majority of the study area. The most common and widespread communities which make up the main bulk of the landscape are MG9 *Holcus lanatus – Deschampsia cespitosa* grassland and M23 *Juncus effusus/acutiflorus – Galium palustre* rush-pasture. M25 *Molinia caerulea – Potentilla erecta* mire and M15 *Trichophorum germanicum – Erica tetralix* wet heath are limited to isolated patches or form mosaics with other communities. A single flush habitat exists comprising M6 *Carex echinata - Sphagnum fallax/denticulatum* mire.

Grassland areas exist in substantial tracts through the study area on acidic to neutral mineral soils, appearing across the study area in their pure forms as well as in mosaics. These areas are a mix of mainly calcifugous or mesotrophic grassland being, in addition to MG9, U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland, U5 *Nardus stricta – Galium saxatile* grassland, and MG10 *Holcus lanatus – Juncus effusus* rush-pasture.

Woodland areas are more concentrated in the north and east of the study area of which many comprise very small stands or form part of mosaics with other communities. W18 *Pinus sylvestris – Hylocomium splendens* forms the largest of the pure woodland stands. W11 *Quercus petraea – Betula pubescens – Oxalis acetosella* woodland forms small isolated woodland stands, with W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* woodland and W17 *Q. petraea – B. pubescens – Dicranum majus* woodland both form mosaics with other mire, grassland, and heath communities.

Very small patches of H9 *Calluna vulgaris – Deschampsia flexuosa* dry heath are found, often with other communities on sloping ground. Two isolated areas of scrub are also included being W23 *Ulex*

europaeus – *Rubus fruticosus* scrub and W24 *Rubus fruticosus* – *Holcus lanatus* underscrub. A single swamp area of the S12 *Typha latifolia* community is present.

It is clear from the vegetation communities described for this study area and discussed in the various sections above that the habitats have been heavily influenced by anthropogenic interaction, from the former use as an opencast coal mine and current grazing livestock. Although some large relatively homogenous stands of vegetation occur across the study area most of the communities described above often form complex mosaics and transitional areas across the study area and are maintained by the current management regime. The survey results indicated the presence of potential GWDTE habitats, as summarised in Table 6-1 above. These habitats have been further assessed based on the underlying hydrogeology and historic land use, and, are not assessed as being truly groundwater dependent in this setting.

8. GLOSSARY

base-poor: environments which have few chemical bases, they are dominated by environmental acids (usually organic acids) and so are acidic.

base-rich: environments which are neutral or alkaline.

calcareous: calcareous grassland forms on soils that are base-rich.

calcifugous: growing or living in acid soil.

circumneutral soil: nearly neutral, having a pH between 6.5 and 7.5.

dicotyledon: a plant that produces flowers and has two cotyledons (i.e. embryonic leaves).

forb: a herbaceous flowering plant that is not a graminoid (grasses, sedges and rushes).

graminoid: grasses; monocotyledonous, usually herbaceous plants with narrow leaves growing from the base. They include the true grasses, of the family Poaceae (also called Gramineae), as well as the sedges (Cyperaceae) and the rushes (Juncaceae).

mesophytic: a land plant that grows in an environment having a moderate amount of moisture, neither a particularly dry nor particularly wet environment.

mesotrophic grassland: neutral grassland, characterised by vegetation dominated by grasses and herbs on a range of circumneutral soils.

monocotyledons: flowering plants group which have just one cotyledon.

mosaic: a pattern of two or more vegetation types disposed in intimate relationships to one another.

oligotrophic: lacking in plant nutrients.

ombrogenous: dependant on rain for its formation. Ombrogenous bog is a peat-forming vegetation community lying above groundwater level: it is separated from the mineral soil, and is thus dependent on rain water for mineral nutrients. The resulting lack of dissolved bases gives strongly acidic conditions. Two types of ombrogenous bogs are commonly distinguished: raised bogs and blanket bogs.

podsol: a soil that develops in temperate to cold moist climates under coniferous or heath vegetation; an organic mat over a grey leached layer.

soligenous: where water movements are predominantly lateral. Produced by inflow of surface water or rise of groundwater and not completely by locally precipitated water.

topogenous mire: a type of mire that forms under climatic conditions of reduced rainfall, with consequent lower humidity and summer drought, which restrict the growth of wetland vegetation to areas where precipitation is concentrated (e.g. valley bottoms).

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Annex 1. NVC Target Notes

A number of target notes were also made during surveys, often to pinpoint springs/flushes, or an area or species of interest, these target notes are shown on Figure 1 and detailed within Table A-1 below. A representative sample of corresponding target note photographs is provided in Annex 2.

Table A. 1 Study Area Target Notes

Target Note ID	Easting	Northing	NVC Community	Description	Photo Reference
1	282617	632328	SW	Large pond with no aquatic vegetation. Approximately 80m x 100m. Fed by Alder Burn from the south.	2-1
2	282398	632420	SW	Large pond with no aquatic vegetation with MG9, U4, and M23 communities around the edge. Approx. 40m x 30m	
3	282753	632637	S12a	*Typha latifolia*, *Juncus effusus*, and *Deschampsia cespitosa*	2-2

Annex 2. Target Note Photographs

The following photographs correlate to the target notes described within Annex 1, Table A.1. Photographs are not provided here for all target notes, due to the similarity in many photographs.

Photo 2-1 Target Note 1, Standing water

Photo 2-2 Target Note 3, S12a *Typha latifolia* swamp

Annex 3. General Community Photographs

The following selected photographs are provided to give a visual representation to a number of the community types present within the study area.

Photo 3-1 Hardstanding

Photo 3-2 Dominant rush based communities across the study area (M23/MG10/JE)

Photo 3-3 Scot's pine woodland (W18)

Photo 3-4 Mosaic dominated by W17 woodland community

282000 282500 283000 283500

633500 633000 632500 632000

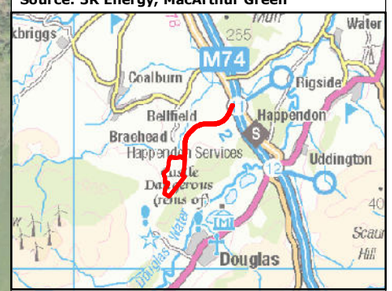
U4/MG9/W7/M23b
U4d/MG9/H9
U5
BG
W18
U4b
U4
W18
U4b
W18/M23b
M25
M23/M25/MG9/U4
MG9/M23b
H9c/M23b/U4/MG9
U4/M23b
W18
CP
U4
U4
MG9
MG9/U4/M15
MG9/U4/M23b
U4
U4
M25
U4
MG9/MG10a/U4
Je/MG9/U4
U4/MG9
U4
MG9
MG9
U4/U5/MG9/BG
U4b
M15b
MG9/M23b/M25a/H9/W24
MG9
U4
U4
MG9/M23b/U4
U4b
U4b/BG
U4
BG
CP
U4b/MG10a
W11
MG9/M25/U4/M23a/H9c/BG
MG9
M23b/MG9/U4
H9c
3
BG/U4
M23b/MG9/U4
U4/MG9
W7/U4/M23b
M23b/MG9/U4
M23b
W11
U4b
M23b
MG9/Je/M23b
SW
SW
2
MG9/U4/M25a/H9/U5
1
MG9/M23b
W17/CP /M15b/M25/M23b/MG9
MG9
MG9
MG9/M23b
M6d
W23
M15
U5/MG9/M23a/U4b
CP
U4b/BG/H9

N

Legend:

- Application Boundary
- Study Area
- NVC Habitat
- Non-NVC Habitat
- Target Note

Source: 3R Energy, MacArthur Green



MacArthur Green

M74 Heat and Power Park

Figure 1

NVC Survey Results

0 125 250
Metres
MAP SCALE: 1:6,500 @ A3

Status: Rev0
Approved: CG
Checked: BJF
GIS TM: LNF
Document Path: S:\Project GIS\3RE\001 Douglas West and Dalquhandy\E_R_Fig1_Habitats_NVC_DWDQ.mxd

Datum: OSGB 1936, Projection: British National Grid

Date: 02/03/2017

282000 282500 283000 283500

633500 633000 632500 632000

U4/MG9/W7/M23b
U4d/MG9/H9
W18/M23b
M25
MG9/M23b
M23/M25/MG9/U4
H9c/M23b/U4/MG9
U4/M23b
MG9
MG9/U4/M15
MG9/U4/M23b
M25
MG9/MG10a/U4
Je/MG9/U4
U4/MG9
MG9
MG9
U4/U5/MG9/BG
M15b
MG9/M23b/M25a/H9/W24
MG9
MG9/M23b/U4
U4b/MG10a
MG9/M25/U4/M23a/H9c/BG
MG9
M23b/MG9/U4
M23b/MG9/U4
U4/MG9
W7/U4/M23b
M23b/MG9/U4
M23b
M23b
MG9/Je/M23b
MG9/U4/M25a/H9/U5
W17/CP /M15b/M25/M23b/MG9
MG9/M23b
MG9
MG9
MG9/M23b
M6d
M15
U5/MG9/M23a/U4b

N

3R Energy
Wind • Biomass

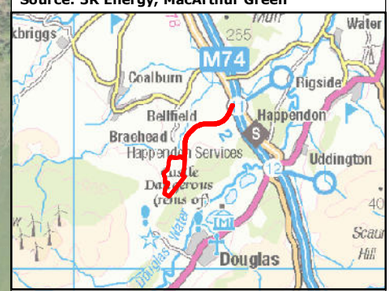
Legend:

- Application Boundary
- Study Area

Potential GWDTE

- Highly - Dominant
- Highly - Sub-dominant
- Moderately - Dominant
- Moderately - Sub-dominant

Source: 3R Energy, MacArthur Green



MacArthur Green

M74 Heat and Power Park

Figure 2

Potential Groundwater Dependent Terrestrial Ecosystem (GWDTE) Survey Results

0 125 250
Metres
MAP SCALE: 1:6,500 @ A3

Status: Rev0 Approved: CG Checked: BJF GIS TM: LNF

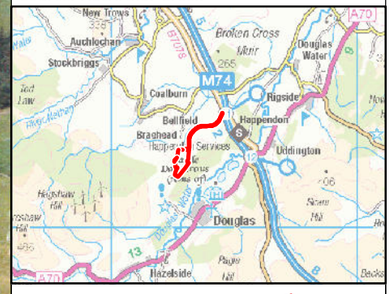
Document Path: S:\Project GIS\3RE\001 Douglas West and Dalquhandy\E_R_Fig2_Habitats_GWDTE_DWDQ.mxd

Datum: OSGB 1936, Projection: British National Grid

Date: 17/03/2017

N

Source: MacArthur Green



MacArthur Green

M74 Heat and Power Park

Figure 3

Dalquhandy Opencast Mine Aerial Imagery 1990

MAP SCALE: NOT TO SCALE

GIS TM: BJF Checked: BJF Approved: CH Status: Rev0

Document Path: S:\Project GIS\3RE\001 Douglas West and Dalquhandy\E_R_Fig3_DOMLP_1990_DWDQ.mxd

Datum: OSGB 1936, Projection: British National Grid

Date: 17/03/2017

282500

283000

633000

632500

DALQUHANDY OPENCAST SITE

ACCESS ROAD

D7

TOPSOIL DUMP

SUBSOIL DUMP

D12

227m

Drain

Track

SHEETING PLATFORM

CONCRETE PAD COAL STOCKING GROUND

TAILINGS

WHEELWASH

WEIGHBRIDGES

ST

STW

WEIGHBRIDGE

BOILER HOUSE

CAR PARK

AMENITY BLOCK

COAL WASHING PLANT

COAL OUTLOADING BUNKERS

Path

RECEPTION AREA

DRY SCREENING PLANT

DIDCOT TUBE

SPARE STORES

WHEELWASH

COAL STOCKING GROUND

WEIGHBRIDGES

Workings (disused)

Disused Railway

DAM POND

WEST COAL STOCKING GROUND

TOPSOIL DUMP

Alder Burn

TOPSOIL DUMP

Track

E 33kv

E 33kv

Lon

N

3R Energy Wind • Biomass

Legend:

Application Site

Existing Access Road

Source: MacArthur Green

MacArthur Green

M74 Heat and Power Park

Figure 4

Dalquhandy Opencast Mine Layout Plan

0 70 140

Metres

MAP SCALE: 1:3,750 @ A3

Status: Rev1

Approved: CH

Checked: BJF

GIS TM: BJF

Document Path: S:\Project GIS\3RE\001 Douglas West and Dalquhandy\E_R_Fig4_DOMLP_DWDQ.mxd

Datum: OSGB 1936, Projection: British National Grid

Date: 17/03/2017

M74 Heat and Power Park

Preliminary Ecological Appraisal (PEA) - Protected Species including Bats

CONFIDENTIAL

CONFIDENTIALITY REQUEST: This confidential report contains sensitive information on the location and activity of badgers and otters. Badgers are protected under the Protection of Badgers Act 1992 (as amended by the Nature Conservation (Scotland) Act 2004 (as amended)). Otters are protected under the Conservation Regulations (1994) (as amended). Its distribution should therefore be limited to 3R Energy relevant project staff, Scottish Natural Heritage and Scottish Badgers (for the badger data only).

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EXECUTIVE SUMMARY

MacArthur Green was commissioned by 3R Energy to carry out protected species surveys for the M74 Heat and Power Park (referred to as the 'Site').

These surveys were undertaken to aid and inform the Preliminary Ecological Appraisal (PEA) for the M74 Heat and Power Park proposed development options.

Surveys were conducted on 09/11/2016 by MacArthur Green which update previous survey effort across the site carried out as part of the Douglas West & Dalquhandy DP Renewable Energy Project Environmental Statement (Energised Environments, 2015). The updated surveys confirmed evidence of otter and potential evidence of badger using the Study Area as well as trees with potential for bat roost. Squirrel dreys were identified on the fringes of the site. It is expected that they are used by grey squirrel. There was no evidence of pine marten using the Study Area.

A small area (c.a. 4.8ha) of the habitat Management Plan (HMP) Management Unit 2 of the neighbouring Douglas West & Dalquhandy DP Renewable Energy Project overlaps with the proposed Development Area for the M74 Heat and Power Park. This part of the site will therefore fall outwith the HMP area. Management aims for Management Unit 2 are:

- Enhancing species richness by implementing grassland management measures and riparian planting; and
- Increase number of breeding waders by implementing grassland management measures.

The loss of land from Management Unit 2 due to the overlap represents only 3.5% of the overall HMP area, therefore it will not have a significant impact on the aims or objectives of the Douglas West & Dalquhandy DP Renewable Energy Project HMP.

1 INTRODUCTION

MacArthur Green was commissioned by 3R Energy to carry out protected species surveys at the M74 Heat and Power Park, approximately 1.5km north of Douglas, South Lanarkshire, (hereafter referred to as the 'Site'). The Site is situated within the red-line boundary of Douglas West & Dalquhandy DP Renewable Energy Project. Surveys focussed on otter *Lutra lutra*, badger *Meles meles*, red squirrel *Sciurus vulgaris,* pine marten *Martes martes* and surveys for structures with bat roost potential.

These protected species surveys were undertaken to inform the PEA for the proposed development options for this Site and inform the planning permission in principle (PPIP) application for the proposed development.

Surveys for birds, water vole *Arvicola amphibious,* great crested newts *Triturus cristatus,* reptiles (adder *Vipera berus*, common or viviparous lizard *Zootoca vivipara*, slow worm *Anguis fragilis*) and fish were scoped out for this PEA due to data available from the Environmental Impact Assessment and technical reports (see Section 4) of Douglas West & Dalquhandy DP Renewable Energy Project.

A watching brief was kept and signs recorded for other protected species potentially inhabiting the Site.

2 THE SITE AND STUDY AREA

The Site consists of open habitats and is adjacent to an area of plantation forestry to the east. Excluding the pre-existing access track, the Site is approximately 50ha in size and lies within an area of former open cast mining activities. A small watercourse, which is a tributary to the Poniel Water flows through the west of the Site from South to North. The Poniel Water flows along part of the northern Site boundary. A former railway line runs along the inside of the eastern Site boundary.

Details of the Study Area for each protected species are provided in Figure 1 and Section 4 of this report.

3 LEGAL PROTECTION

The details of the legal protection of the protected species surveyed for are given in Annex 1.

4 METHODS

Surveys to record the presence or likely absence of otter, badger, red squirrel, pine marten and bat roost features specifically were carried out within the Study Area on 09/11/2016 during which all habitats suitable for these species were surveyed (excluding the pre-existing access road) plus an appropriate buffer according to the species involved, as described in the sections below and shown in Figure 1.

A watching brief for any protected species signs was undertaken during other survey visits (vegetation surveys) to the Site.

The signs found indicate type and intensity of protected species activity and consequently help in the assessment of the importance of a particular area for the protected species. The survey methods used are described below. The surveys undertaken as part of this assessment refresh and update the

significant baseline survey information covering the site that was collated as part of the Douglas West & Dalquhandy DP Renewable Energy Project Environmental Statement (Energised Environments, 2015).

4.1 Desk-based Study

A desk-based study was undertaken in order to inform the field surveys and assessment with regards to the presence of designated sites and species of interest within the Site and its environs. This study consisted of the consultation of various resources, including:

- Douglas West & Dalquhandy DP Renewable Energy Project Environmental Statement[1]
- Badger Survey of the Proposed Douglas West Community Wind Farm[2]
- Otter and Water vole Survey of the Proposed Douglas West Community Wind Farm[3]
- Squirrel Hair-Tube Survey at the Proposed Glentaggart East Surface Mine[4]
- Great Crested Newt e-DNA & Presence/Absence Surveys 2015 of the Proposed Douglas West & Dalquhandy DP Renewable Energy Project[5]
- Great Crested Newt Habitat Suitability Assessment 2014 of the Proposed Douglas West & Dalquhandy DP Renewable Energy Project[6]
- Douglas West and Dalquhandy DP Renewable Energy Project - Bat Survey Report[7]
- Douglas West WF Ecological Baseline Report: Fisheries Habitat and Fish Fauna Surveys[8]

4.2 Otter

All accessible watercourses within the Site (excluding the pre-existing access road) plus a 250 metre buffer were surveyed for otter field signs. Otter field signs and survey methods are described in Bang & Dahlstrøm (2001), Sargent & Morris (2003) and Chanin (2003), and include:

[1] 3RE (2015): Douglas West & Dalquhandy DP Renewable Energy Project Environmental Statement – Section 7: Ecology and Nature Conservation.
[2] Dunnock Environmental Services (2014): Badger Survey of the Proposed Douglas West Community Wind Farm, South Lanarkshire (Confidential Report).
[3] Dunnock Environmental Services (2015): Otter and Water vole Survey of the Proposed Douglas West Community Wind Farm, South Lanarkshire (Confidential Report).
[4] Dunnock Environmental Services (2009): Squirrel Hair-Tube Survey at the Proposed Glentaggart East Surface Mine, Douglas, South Lanarkshire.
[5] Dunnock Environmental Services (2015): Great Crested Newt e-DNA & Presence/Absence Surveys 2015 of the Proposed Douglas West & Dalquhandy DP Renewable Energy, ES Appendix 7.4.
[6]Dunnock Environmental Services (2014): Great Crested Newt Habitat Suitability Assessment 2014 of the Proposed Douglas West & Dalquhandy DP Renewable Energy Project, ES Appendix 7.3.
[7] MacArthur Green (2015): Douglas West and Dalquhandy DP Renewable Energy Project Bat Survey Report (SEI Appendix 2.1).
[8]EcoFish Consultants (2012): Douglas West WF Ecological Baseline Report: Fisheries Habitat and Fish Fauna Surveys (ES Appendix 7.7).

Holts: Underground features where otters live. They can be tunnels within bank sides, underneath root-plates or boulder piles, and even man-made structures such as disused drains. Holts are used by otters to rest up during the day, and are the usual location of natal or breeding sites. Otters may use holts permanently or temporarily;

Couches: These are above ground resting-up sites. They may be partially sheltered, or fully exposed. Couches may be regularly used, especially in reed beds and on in-stream islands. They have been known to be used as natal and breeding sites. Couches can be very difficult to identify, and may consist of an area of flattened grass or earth. Where rocks or rock armour are used as couches, these can be almost impossible to identify without observing the otter in-situ;

Prints: Otters have characteristic footprints that can be found in soft ground and muddy areas;

Spraints: Otter faeces may be used to mark territories, often on in-stream boulders. They can be present within or outside the entrances of holts and couches. Spraints have a characteristic smell and often contain fish remains;

Feeding signs: The remains of prey items may be found at preferred feeding stations. Remains of fish, crabs or skinned amphibians can indicate the presence of otter;

Paths: These are terrestrial routes that otters take when moving between resting-up sites and watercourses, or at high flow conditions when they will travel along bank sides in preference to swimming; and

Slides and play areas: Slides are typically worn areas on steep slopes where otters slide on their bellies, often found between holts or couches and watercourses. Play areas are used by juvenile otters in play, and are often evident by trampled vegetation and the presence of slides. These are often positioned in sheltered areas adjacent to the natal holt.

Any of the above signs (apart from paths) are diagnostic of the presence of otter. However, it is often not possible to identify couches with confidence unless other field signs are also present. Spraints are the most reliably identifiable evidence of the presence of this species.

4.3 Badger

Land with the potential to support badger within the Site (excluding the pre-existing access road) and a buffer of 100 metres, was searched for field signs with particular attention given to areas around woodland and areas underlain by mineral soils as opposed to peat. Field signs of badger are described in Neal and Cheeseman (1996), Bang and Dahlstrøm (2001), and SNH (2001). Field evidence searched for included:

Holes: (i.e. setts, single and/or groups of holes);

Prints: badgers have characteristic footprints that can be found in soft ground and muddy areas;

Latrines (and dung pits used as territorial markers): These are small excavated pits in which droppings are deposited;

Hairs: Tufts of hair can often be found on fences, or in the entrances to setts;

Feeding signs (snuffle holes): Small scrapes where badgers have searched for insects and plant tubers;

Scratching posts: marks on trees (including fallen trees) where badgers have scratched leaving claw marks or ripped at areas of rotten bark to search for food; and

Paths: These are routes that badgers take when moving between setts and foraging areas.

4.4 Pine Marten

Signs of pine marten were searched for within the Site (excluding the pre-existing access road) and a buffer of 30 metres, following guidance from O'Mahony *et al*. (2006). Searches for pine marten scats were made along linear features such as fence lines, and around rock piles and dense scrub where the species could establish a den. Dens can include the utilisation of upturned trees, tee cavities, rocks or manmade structures such as log piles or large bird boxes.

4.5 Red Squirrel

Areas of woodland that have the potential to support red squirrel were surveyed for squirrels within the Site (Excluding the pre-existing access road) and a buffer of 30 metres, following guidance from Gurnell *et al*. (2009). Survey methods included:

- **Red squirrels**: visual sightings of red squirrels;
- **Dreys**: potential dreys were noted; dreys are usually built close to the main stem of a tree, over 3m from ground level and over 50x30cm in size (Gurnell *et al*., 2009); and
- **Feeding signs**: predated cone (cone cores) searches in areas of woodland.

4.6 Bat Roost Suitability

A daytime inspection of the Site (excluding the pre-existing access road) and a buffer of 30 metres was carried out. This inspection involved a walkover of the Study Area recording different habitat types and their suitability to support bats. Potential roost features such as trees and buildings within the Study Area were also mapped and recorded as target notes.

Tree surveys followed the assessment methodology as set out in Collins (2016) whereby a tree is assigned a suitability of low, moderate or high, which determines the likelihood of bats being present and the need for further survey work such as a climbing inspection and/or dusk and dawn surveys.

5 SURVEY LIMITATIONS

Dreys of red squirrel and grey squirrel are similar and cannot be distinguished on the drey structure alone. Determination of the squirrel species is only possible if sightings (or recordings) of the animals using the drey are made.

A light snow cover was present within the Study Area during some surveys, however, it is unlikely that field signs of the target species would have been covered by the thin layer of snow.

It is not believed that the survey limitations described above have had a significant impact on the overall conclusions of this report, particularly given the significant extent of previous survey information available for the site.

6 RESULTS

6.1 Desk Based Study

Desk study results have been integrated into the results section of each species, as shown below.

6.2 Badger

Badgers were confirmed present in the surrounding areas of the Site during surveys for the Douglas West & Dalquhandy DP Renewable Energy Project, with field signs present along Poniel Water. No setts were found within the Study Area for M74 Heat and Power Park during previous surveys informing the Douglas West & Dalquhandy DP Renewable Energy Project.

The Study Area has limited suitable habitat for badger, with open areas suitable for feeding, but less likely to be suitable for sett construction, due to hydrological conditions. Areas in the east of the Study Area, which include the edge of the conifer plantation, offer some habitat which may be suitable for sett construction.

During field surveys two potential feeding signs (potential snuffle holes) were found along Poniel Water in the north of the Site near the Site boundary. No other field signs of badger were detected during surveys.

6.3 Otter

Otters were confirmed to be using the wider area of the Site during previous surveys undertaken for the Douglas West & Dalquhandy DP Renewable Energy Project in 2014/15. No signs of otter were previously recorded within the Study Area for this Site.

The habitat along the Poniel Water and its tributaries within the Study Area are suitable for otter feeding and commuting. There is some habitat that is suitable for otter resting sites along the Poniel Water with a slightly steeper bank that may be suitable for otter holts. Habitat along the smaller tributary offers very low habitat suitability for otter resting sites. The pond to the south of the Study Area offers some suitable habitat for foraging otter and the steeper banks may be suitable for otter holts, although there is little cover provided by vegetation immediately at the edge of the pond.

The otter survey was conducted in suitable weather with no heavy rain on the day of survey and within the previous two days. A light cover of snow was on Site. During field surveys, two otter spraints were found at the Poniel Water to the north of the Site. No other field signs for this species was found during surveys.

6.4 Red Squirrel

As noted in the Douglas West & Dalquhandy DP Renewable Energy Project ES, historical surveys of local area (as cited in Dunnock Environmental Services, 2009) revealed very low levels of red squirrel activity within Townhead Wood (outwith the site, 1.8 km to the east) and Long Plantation (outwith but adjacent to the site

on the east) with the most recent record dating from 2007. However, all the surveys recorded higher levels of grey squirrels in the area and the 2009 survey of Townhead Wood did not record any red squirrel evidence. Dunnock Environmental Services observed a grey squirrel during the 2014 surveys of the site. Red squirrels were therefore scoped out of the ES for the Douglas West & Dalquhandy DP Renewable Energy Project.

The habitat within the conifer plantation to the east of the Site is suitable for both grey and red squirrel species. The habitat within the Study Area, consisting of mostly open habitats, is unlikely to be used by squirrels apart from the trees and woodland edge in the eastern areas of the Study Area along the former railway embankment.

During field surveys two squirrel dreys were found within the eastern woodland edge of the Study Area, close to the former railway line. Both dreys was located in silver birch trees *Betula pendula*. No squirrels were seen using the drey and therefore squirrel species and use of drey could not be determined. Given the previous sighting of grey squirrel on the site in 2014, it is most likely that the dreys belong to grey squirrel. No other field signs of squirrel were found during the field surveys.

6.5 Pine Marten

Pine marten were scoped out of assessment for the Douglas West & Dalquhandy DP Renewable Energy Project, therefore, no previous surveys for pine marten were undertaken.

The open habitat within the Study Area is not suitable for pine marten, but the adjacent conifer plantation and areas of smaller trees within western areas of the survey area offer some habitat suitability for this species.

No field signs of pine marten were found within the Study Area during surveys.

6.6 Bat Roost Suitability

Bat roost surveys were previously undertaken in 2014 and 2015 for the Douglas West & Dalquhandy DP Renewable Energy Project. Two stone railway bridges were found and inspected using endoscopes during these surveys. No signs of use by bats were found during the endoscopy surveys in 2015.

The same two railway bridges were found during field surveys within the Study Area for this Site. The bridge to the south at NS 82631 32103 (Photograph 2) was found to have low roosting potential, the bridge further north at NS 83083 32593 (Photograph 1) was assessed as being unlikely to be used by bats.

Habitat suitable for bats is limited to the eastern edge of the Study Area, along the plantation forestry and some scattered trees in this area.

All field survey results are listed within Annex 2.

6.7 Other Species

No other species were observed during field surveys. Great-crested newts were scoped out of the surveys for Douglas West & Dalquhandy DP Renewable Energy Project due to no suitable habitat

(ponds) being on Site. Therefore there is no suitable great-crested newt habitat within the Study Area of for M74 Heat and Power Park.

7 DISCUSSION AND RECOMMENDATIONS

7.1 Otter

Two otter spraints were found during the field surveys.

The Study Area offers some suitable habitat for otter along the Poniel Water and its tributary as well as the pond to the south of the Site. Some of the watercourses within the wider area may offer additional suitable foraging opportunities and the habitats surrounding them may offer suitability for supporting amphibian species on which otters could feed.

With spraints present on the periphery of the Site and otter holts known to occur in the wider area (previous survey data[3]), it is likely that otter will occasionally commute along the watercourses within the Study Area.

Maintaining water quality throughout any works taking place will be required to maintain the food resource for otter within the wider area. Improving the water quality (see M74 Heat and Power Park Hydrology Report) on Site is likely to improve prey availability and overall habitat quality for otters in the wider area, in the longer term.

The following mitigation measures for large mammals should be implemented to reduce general disturbance from the proposed site investigation works:

a) **Badgers, pine martens and otters are highly mobile mammals that can occupy new areas and construct new setts in a short period of time. Update protected species surveys are therefore recommended before any construction starts on site and advice from a suitably qualified Ecologist should be sought regarding need for update surveys prior to the submission of any reserved matters application at the detailed design stage. A full survey of any stretches of watercourses to be diverted should be undertaken immediately in advance of diversion works and any recommended mitigation measures should be implemented accordingly. Should any sign of new setts, dens or holts or other protected feature be detected during works at any time, all works in this area should be stopped and advice sought from a suitably qualified Ecologist.**

b) **Covering/securing all excavations and piping. If this is not possible then a means of escape must be provided for any animal that could fall in e.g. a ramp with a gradient of 45° or shallower;**

c) **Any temporarily exposed open pipe system should be capped in such a way as to prevent mammals gaining access, as may happen when contractors are offsite. If such pipes are left for an extended time, periodic checks will be carried out to ensure that the pipe is inaccessible to animals;**

d) All excavations will be checked at the start of works and prior to the commencement of any works activities to ensure large mammals are not present or have become trapped overnight. A responsible individual will be tasked with carrying out these checks. Documentary evidence will be completed for each check;

e) Night time working will be minimised to reduce disturbance to nocturnal and crepuscular fauna. Where this is not possible, security lighting used in the compound and those areas where lighting is absolutely necessary to ensure safe working conditions will be angled downward to reduce light spill into adjacent areas. Lighting outwith the compound will be switched off when no works are being undertaken. Other required lighting will be directed to where it is needed and away from features (including tree lines, watercourses/riparian habitats, etc.) to minimise light disturbance;

f) A speed limit of 15 mph for all vehicles in the using the Site; and

g) **Chemicals should be stored in accordance with best practise. All paints, chemicals and sealants used during the investigation process will be removed from the working area at the end of each working day. Open tins or other containers will not be left at the works areas but will be stored in a suitable container at the compound.**

7.2 Badger

Potential badger feeding signs were found on the periphery of the site during the field surveys, but no other badger signs were identified within the Study Area.

With badgers known to be present in the wider area[2], it is likely that badgers frequently use the Study Area. The habitats present within the Study Area offer suitable habitat for supporting foraging and commuting. Habitat suitable for setts is limited due to the hydrological conditions on site, detailed in the Habitat Survey Report (see areas covered by the Ground Water Dependant Terrestrial Ecosystem assessment). There may be more suitable habitat to the eastern edge along the forestry plantation, although the hydrology of the ground may also be unfavourable for the construction of badger sets here.

Recommendations are as per Section 7 above.

7.3 Pine Marten

No field signs of pine marten were found within the Study Area.

Pine marten are known to exploit old coniferous plantations to create dens, access prey and gain protection from predators (Caryl, 2008). This kind of habitat is present to the east of the Study Area.

Pine marten are likely to avoid clear-fell areas, taking preference to forested areas (Halliwell, 1997). There is the potential for pine marten to use open, felled and rejuvenating land for hunting due to the increased access to prey species, however, these habitats offer an increased risk of predation from foxes and raptor species (MacPherson, 2014).

It is known that the pine marten range is expanding in Scotland (Croose et al. 2013). The home ranges of pine marten are variable in Scotland, by both location and sex, with previous studies recording home ranges of males in Galloway as up to 33 km^2 (Bright and Smithson, 1997) and home ranges of females in Morangie as less than 1 km^2 (Caryl, 2008). Although fragmented, there are a large number of forestry blocks present within the wider vicinity of the Site and there is the potential for pine marten to move in from other areas, however, no evidence of pine marten exists within the Study Area at present

Recommendations are as per Section 7 above.

7.4 Red Squirrel

Evidence of Squirrel was recorded in the Study Area in the form of potential squirrel dreys (Photograph 3 and Photograph 4).

Suitable squirrel habitat is limited to the eastern edge of the Study Area, along the forestry plantation and the trees along the former railway embankment. It is not possible to determine whether dreys are used and by which species they are used without further surveys. Historical records for red squirrel are known for the wider area from the 1990s. Since then there has been indication that red squirrel populations have likely been displaced by grey squirrel (review of squirrel survey finding, DE (2009)[4].

There is very low potential for a remnant population of red squirrel being present in the wider area. Therefore it is believed that surveys are not necessary at this stage given that the two drey structures found on site are likely built and used by grey squirrels. However, further surveys to determine the use of dreys and species of squirrel using them should be undertaken, if there is any indication that red squirrels are using the area and a brief update of the desk study should be undertaken prior to any works starting any later than 12 month of this survey report.

An SNH license would be required for any works within 30m of a red squirrel drey, or where felling is undertaken up to 50m or a tree length distance form a red squirrel drey.

7.5 Bat Roost Suitability

Both structures found during the field surveys have previously been surveyed and assessed[7].

The stone railway bridge at NS 83083 32593 is unlikely to be used by bats at any time of the year and therefore further surveys will not be necessary at this structure.

The stone railway bridge at NS 82631 32103 was assessed in the previous study to have low roost potential for bat during all of the year, including the hibernation season.

Although no signs of bats were found during previous surveys, it is recommended that should any works or demolition be proposed at the railway bridge at NS 82631 32103, or within 30m of this structure, bat activity surveys will need to be repeated to confirm that it is not used as a bat roost.

An SNH licence to destroy or disturb any confirmed bat roosts would be required prior to commencement of construction works within 30m of any roosts. Licences may be granted for certain purposes that would otherwise be illegal. There is no provision for development as such; however,

under Regulation 44 (2e) of the Conservation (Natural Habitats, &c.) Regulations 1994 licences may be granted for: Preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.

However a licence will not be granted unless, under Regulation 44 (3), the appropriate licensing authority is satisfied that:

- There is no satisfactory alternative; and
- That the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

7.6 Other Species

General best practise measures to maintain water quality during any works are recommended.

A breeding bird survey may be required prior to any works during the breeding bird season.

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Annex 1. Legal Protection

Otters and all species of **bats** receive protection under the Conservation Regulations (1994) (as amended) only[9].

Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)

Under Regulation 39 (1) it is an offence to:

(a) deliberately or recklessly to capture, injure or kill a wild animal of a European protected species;
(b) deliberately or recklessly:
  (i) to harass a wild animal or group of wild animals of a European protected species;
  (ii) to disturb such an animal while it is occupying a structure or place which it uses for shelter or protection;
  (iii) to disturb such an animal while it is rearing or otherwise caring for its young;
  (iv) to obstruct access to a breeding site or resting place of such an animal, or otherwise to deny the animal use of the breeding site or resting place;
  (v) to disturb such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs; or
  (vi) to disturb such an animal in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young;
(c) deliberately or recklessly to take or destroy the eggs of such an animal; or
(d) to damage or destroy a breeding site or resting place of such an animal.

Regulation 44 (2e) allows a licence to be granted for the activities noted in Regulation 39 such that:

Preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.

Otter is also listed on Appendix I of CITES, Appendix II of the Bern Convention and Annexes II and IV of the Habitats Directive (1994). It is also listed as globally threatened on the IUCN/WCMC Red Data List.

[9] The Conservation Amendment (Scotland) Regulations (2007) removed EPS from Schedule 5 and 8 of the Wildlife and Countryside Act 1981.

Badgers are protected under the Protection of Badgers Act 1992 (as amended by the Nature Conservation (Scotland) Act 2004 (as amended)).

The following applies under this legislation:

Part 1.–

(1) A person is guilty of an offence if, except as permitted by or under this Act, he wilfully kills, injures or takes, or attempts to kill, injure or take, a badger.

(2) If, in any proceedings for an offence under subsection (1) above consisting of attempting to kill, injure or take a badger, there is evidence from which it could reasonably be concluded that at the material time the accused was attempting to kill, injure or take a badger, he shall be presumed to have been attempting to kill, injure or take a badger unless the contrary is shown.

(3) A person is guilty of an offence if, except as permitted by or under this Act, he has in his possession or under his control any dead badger or any part of, or anything derived from, a dead badger.

Part 3. –

(1) A person is guilty of an offence if, except as permitted by or under this Act, he interferes with a badger sett by doing any of the following things–

(a) damaging a badger sett or any part of it;

(b) destroying a badger sett;

(c) obstructing access to, or any entrance of, a badger sett;

(d) causing a dog to enter a badger sett; or

(e) disturbing a badger when it is occupying a badger sett,

(f) intending to do any of those things or being reckless as to whether his actions would have any of those consequences.

(2) A person is guilty of an offence if, except as permitted by or under this Act, he knowingly causes or permits to be done an act which is made unlawful by subsection (1) above.

Note: A badger sett is defined in law as any structure or place which displays signs of current use by a badger.

Red squirrels and pine martens are protected by the following legislation:

Wildlife and Countryside Act (1981)
Nature Conservation (Scotland) Act 2004

Under Section 9, Subsection 1, it is an offence to:
Intentionally or recklessly:

- Kill, injure or take any wild animal listed on Schedule 5;
- Damages or destroys or obstructs access to, any structure or place that any animal listed on Schedule 5 uses for shelter or protection;
- Disturbs any such animal while it is occupying a structure or place which is uses for that purpose
- Sell, offer or expose for sale, or possess or transport for the purpose of sale, any live or dead wild animal included in Schedule 5, or any part of, or anything derived from, such an animal.
- Publish or cause to be published any advertisement likely to be understood as conveying that he buys or sells, or intends to buy or sell, any of those things.

Annex 2. Survey Results

Species	Sign	Grid reference		Notes	Photo
Otter	Spraint	NS 33185	82831	Potential otter spraint on boulder along the edge of the burn known as Poniel Water. Restricted access to boulder due to location in burn and high sided banking. Potential spraint viewed through binoculars.	n/a
Otter	Spraint	NS 33182	82811	Potential otter spraint on bedrock in middle of burn. No smell or visible bone fragments. Approximately 5.5cm in length.	n/a
Badger	Other Field Signs	NS 33154	82977	Potential snuffle holes found beneath Scot's Pine woodland. No other field signs in support of this so unable to confirm. Area grazed so may also be trampled. Stone and wire fence close by but no field signs found.	n/a
Badger	Other Field Signs	NS 33154	82943	Potential snuffle holes within same woodland area on embankment above Poniel Water. No additional field signs.	n/a
Red Squirrel	Drey	NS 32415	83025	Drey in silver birch tree approx. 7m agl. In tree which is located adjacent to a stone wall along a strip of woodland which is dominated by silver birch trees.	Photograph 3
Bat	Moderate	NS 32593	83083	No cracks in arch of bridge. Crack on either side of arch. Look to extend inwards. This was surveyed in 2015 with an endoscope.	Photograph 1
Bat	Moderate	NS 32103	82631	Bridge with cracks in arch and along the sides of the bridge. Surveyed in 2015.	Photograph 2
Red Squirrel	Drey	NS 32436	82969	Possible squirrel Drey. Ball like structure.	Photograph 4

Annex 3. Photographs

Photograph 1 Former Railway Bridge at NS 83 083 32593

Photograph 2 Former Railway Bridge at NS 82631 32103

Photograph 3 Squirrel Drey at NS 83025 32415

Photograph 4 Squirrel Drey at NS 82969 32436

Annex 4. Figures

Figure 1: Protected Species Survey Results

282000 282500 283000 283500 284000

633500 633000 632500 632000

3R Energy
Wind • Biomass

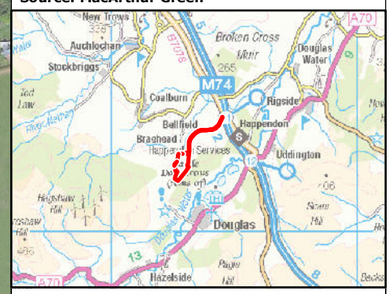
Legend:

- Application Site
- 30m Study Area
- 100m Study Area
- 250m Study Area

Species, Sign

- Badger, Other Field Signs
- Bat, Bridge Roost Potential
- Otter, Spraint
- Squirrel, Drey
- 30m Drey Disturbance Zone
- 50m Drey Disturbance Zone
- 30m Roost Disturbance Zone

Source: MacArthur Green



MacArthur Green

M74 Heat and Power Park

Figure 1

Protected Species Survey Results

0 125 250
Metres
MAP SCALE: 1:6,500 @ A3

N

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Datum: OSGB 1936, Projection: British National Grid

Date: 02/03/2017

Status: Rev2 Approved: CG Checked: BJF GIS TM: BJF

Document Path: S:\Project GIS\3RE\001 Douglas West and Dalquhandy\E_R_Fig1_PSSR_Ae_DWDQ.mxd