County: West Yorkshire, Lancashire, Greater Manchester, North Yorkshire.

Site Name: South Pennine Moors

District: Bradford, Calderdale, Kirklees, Leeds, Craven, Burnley, Pendle, Oldham, Rochdale.

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act, 1981

Local Planning Authority:
Bradford Metropolitan District Council
Calderdale Metropolitan Borough Council
Kirklees Metropolitan District Council
Leeds City Council
Craven District Council
Burnley District Council
Pendle District Council
Oldham Metropolitan Borough Council
Rochdale Metropolitan Borough Council

National Grid Reference: SD 920300 **Area:** 20,938.05 (ha)

Ordnance Survey Sheet 1:50,000: 103, 104, 109, 110 **1:10,000:**
SD 82 NE
SD 83 SE
SD 91 NW, NE, SW, SE
SD 92 NW, NE, SW, SE
SD 93 NW, NE, SW, SE
SD 94 SW, SE
SE 00 NW
SE 01 NW, SW
SE 02 NW, SW
SE 03 NW, SW, SE
SE 04 NW, SW, SE
SE 14 NW, NE, SW, SE

Date Notified (Under 1981 Act): 26 September 1994 **Date of Last Revision: –**

Other Information:
1. This site incorporates the existing Haworth Moor, Derby Delph, Pule Hill and Standedge Road Cutting SSSIs.
2. This site includes land which has been proposed for designation as a Special Protection Area under the EC Directive 79/409 on the Conservation of Wild Birds.

Description and Reasons for Notification:
This site forms part of the Southern Pennines lying between Ilkley in the north and the Peak District National Park boundary in the south. The majority of the site is within West Yorkshire but it also covers areas of Lancashire, Greater Manchester and North Yorkshire. The largest moorland blocks are Ilkley Moor, the Haworth Moors, Rishworth Moor and Moss Moor.

The underlying rock is Millstone Grit which outcrops at Boulsworth Hill and on the northern boundary of Ilkley Moor. The moorlands are on a rolling dissected plateau between 300m and 450m AOD with a high point of 517m at Boulsworth Hill. The greater part of the gritstone is overlain by blanket peat with the coarse gravely mineral soils occurring only on the lower slopes.

The site is the largest area of unenclosed moorland within West Yorkshire and contains the most diverse and extensive examples of upland plant communities in the county. Extensive areas of blanket bog occur on the upland plateaux and are punctuated by species rich acidic flushes and mires. There are also wet and dry heaths and acid grasslands. Three habitat types which occur on the site are rare enough within Europe to be listed on Annex 1 of the EC habitats and Species Directive (92/43) EEC. These communities are typical of and represent the full range of upland vegetation classes found in the South Pennines.

This mosaic of habitats supports a moorland breeding bird assemblage which, because of the range of species and number of breeding birds it contains, is of regional and national importance. The large numbers of breeding merlin *Falco columbarius*, golden plover *Pluvialis apricaria* and twite *Carduelis flavirostris* are of international importance.

The southern end of the site has good exposures of the Millstone Grit series and three localities are described under the heading 'Geology'.

Vegetation:
The blanket bogs of the South Pennine Moorlands are dominated by cotton-grass *Eriophorum* spp., and heather *Calluna vulgaris*. Other dwarf shrubs such as crowberry *Empetrum nigrum* and bilberry *Vaccinium myrtillus* occur in varying amounts. Crowberry is abundant on the eroding margins of the blanket bogs of the South Pennine Moors. Unusually it is also abundant in some areas of the cotton grass and heather moors. This crowberry dominant moor is restricted to the South Pennines and is particularly extensive on Ilkley Moor. Areas of wet heath containing cross-leaved heath *Erica tetralix* and cranberry *Vaccinium oxycoccos* have also developed on the blanket mires.

The lower slopes are dominated by heather moorland with large areas of acid grassland. Some parts of the heather moors are burnt for red grouse *Lagopus lagopus* and sheep management. Other dwarf shrubs occur on the heather moors including bilberry, crowberry and the locally uncommon cloud berry *Rubus chamaemorus*.

The large areas of acid grassland on former heathland reflect patterns of heavy grazing and burning. These grasslands are dominated by mat-grass *Nardus stricta* and wavy hair-grass *Deschampsia flexuosa*. On wet slopes purple moor grass *Molinia caerulea* is dominant with the wettest areas supporting heath rush *Juncus squarrosus*.

The most species rich and diverse habitats are the acidic flushes, mires and seepage lines. The more acidic flushes on the blanket peat are dominated by cotton-grass *Eriphorum vaginatum* with sedges like carnation sedge *Carex panicea*, star sedge *C. echinata* and commons sedge *C. nigra* present. In some of these flushes bog asphodel *Narthecium ossifragum* is present or even dominant amongst the moss *Sphagnum* spp/*Polytrichum* spp carpets which also often have dense populations of cranberry. The majority of flushes are less acidic and soft rush *Juncus effusus* tends to dominate in these wetlands with a few herbs like marsh bedstraw *Galium palustre* or bog stichwort *Stellaria alsine* present. Where the waters are richer in minerals, e.g. below springs, a wider range of herbs occur. Marsh violet *Viola palustris*, marsh

pennywort *Hydrocotyle vulgaris* and blinks *Montia fontana* are most common but in a few places rarer species like bogbean *Menyanthes trifoliata* and round-leaved sundew *Drosera rotundifolia* occur. The latter is now very rare in West Yorkshire. The most notable species in these flushes is the pale forget-me-not *Myosotis stolonifera*. This nationally scarce plant is found in only 32 1km squares in Britain, but occurs at two locations on the South Pennine Moors.

There are several regionally important plant communities within the site. Green Withins holds the largest population of bog pondweed *Potamogeton polygonifolius* within West Yorkshire and Ilkley Moor has the only known locality for chickweed wintergreen *Trientalis europaea* in the county. The latter is close to the site where the famous 17th century botanist John Ray found this species in the 1600s. Crags within the cloughs have ungrazed ledge communities which include ferns not found in other parts of the moors. The beech fern *Phegopteris connectilis* which is now very rare in West Yorkshire survives in at least on clough at the southern end of the site.

Birds:
The moorlands support nationally important numbers of golden plover *Pluvialis apricaria*, curlew *Numenius arquata*, merlin *Falco columbarius* and twite *Carduelis flavirostris*.

These species and the rest of the moorland breeding bird assemblage require the mosaic of habitats and large area of the moors for their survival. The blanket bogs are the main breeding grounds for the golden plover and dunlin *Calidris alpina*. These birds need relatively short vegetation to nest in and access to wet areas to feed, a combination provided by the blanket mires. The South Pennine Moors hold 1.3% of the British breeding population of golden plovers. The very large number of meadow pipits *Anthus pratensis* nesting on the bogs are a major food source for the merlin.

The deeper cover provided by the heather provides nest sites for a range of other species. The merlin population of the South Pennine Moors is particularly important. 4.7% of the British population nests on these moors and the numbers appear to be increasing. Merlin prefer nest sites in the older leggy heather, bracken beds or small trees on the moorland edge and they feed on skylarks *Alauda arvensis* and meadow pipits. Most reliant on the heather moors are the red grouse *Lagopus lagopus scoticus* a sub-species of the willow grouse restricted to the British Isles. Their stronghold is on the managed moors of the Haworth Moors complex. Golden plover are also known to nest on recently burnt areas of heather.

Curlews favour the wet acid grasslands and semi-improved areas on the edge of the moors to breed. A significant number (0.8%) of the British curlew population breed on the South Pennine Moors sharing this habitat with lapwing *Vanellus vanellus* and in the wettest areas snipe *Gallinago gallinago* and redshank *Tringa totanus*.

Twite *Carduelis flavirostris* on the South Pennine Moors represent 1% of the British breeding population. These birds are an isolated southern out-post of the race *pipilans* that occurs only in Scandinavia and the British Isles and is itself isolated from the rest of the world population in the mountains of Central Asia. The birds on the South Pennine Moors are vital to maintain the present world distribution. Twite use virtually all the moorland habitats at different stages of their lifecycle. They prefer heather for nesting but also use bracken, boulder screes, grass tussocks and dry stone walls. Feeding on small seeds they utilise grassy areas throughout the moorlands, weedy areas on the moorland edge, semi-improved pastures and even areas of burnt *Molinia* grassland.

Peregrine *Falco peregrinus* nest in small numbers on suitable crags and disused quarries and up to three pairs of short-eared owl *Asio flammeus* have nested in recent years. The moors also support wheatear *Oenanthe oenanthe*, whinchat *Saxicola rubetra*, ring ouzel *Turdus torquatus* and in some years stonechat *Saxicola torquata*.

The large reservoirs within and adjacent to the site provide feeding areas for moorland nesting birds like dunlin as well as nesting habitat for common sandpiper *Actitis hypoleucos* and grey wagtail *Motacilla cinerea*.

Two more unusual species that nest on the reservoirs are the little ringed plover *Charadrius dubius* and the shelduck *Tadorna tadorna*. The pair of shelduck nesting at Blackstone Edge reservoir are believed to be the highest altitude (1100 feet) nesting birds of this species in Britain. The streams draining the reservoirs and the moors support small numbers of dippers *Cinclus cinclus*.

Geology:
Three locations of special geological interest are identified within the South Pennine Moors: two areas of deltaic sedimentary rocks and a type locality for two diagnostic fossils.

Derby Delph Quarry (SE 017161). This quarry is of considerable sedimentological interest, it displays sandstones of Namurian age displaying two distinct bed form types, one consisting of large scale cross-bedded units and the other showing undulatory bedding. The latter type of structure was first described from this locality, and its relationship to the cross-bedded units is clearly visible. The interpretation of these structures has been a key factor in establishing a model for coarse sediment deposition in distributary channels, and thus for deltaic sedimentation as a whole.

In layman's terms, the quarry and rock outcrops within this site provide excellent exposures of sandstone layers of the Namurian Series, formed during the Carboniferous Period of geological history, about 315 million years ago. The sandstones originally accumulated on the bed of a major river delta, perhaps comparable to the modern Mississippi delta. The form of the sandstone layers is remarkably well displayed and detailed research here has enabled geologists to understand for the first time some of the characteristics of sand deposits formed in river deltas. This is thus an important site for geological study of the Namurian which has made a significant contribution to the understanding of river-bed deposits.

Standedge Road Cutting (SE 018095-023098). This site provides one of the most complete sections through the Namurian Kinderscout Grit, almost in their entirety, with the Butterly Marine Band intervening. The readily accessible sequence presents an excellent example of deltaic cyclotherms, with shales and sandstones capped by seat earths and thin coals.

A key section of great sedimentological interest in a thick stratigraphically important sandstone sequence.

In layman's terms, this road cutting provides important exposures of the Kinderscout Grit which formed during the Carboniferous Period of geological time, about 320 million years ago. The rock sequence consists of thick sandstone layers separated by layers of shale, clay and thin coal seams. The rocks accumulated on a large river delta and contain important layers rich in the fossilised remains of marine animals which accumulated during periods when the delta became flooded by the sea. The rock layers accumulated in a repeated (or cyclic) sequence characteristic of sediments formed on a river delta. This is an important site for geological

study of the Namurian series, and is of special interest as a reference section for comparative purposes.

Pule Hill (SE 032112-0321117). The section here exposed contains the Namurian Pule Hill Grit, at its type locality, overlying a sequence of goniatite-bearing shales. These constitute the type locality of the stratigraphically diagnostic goniatites *Reticuloceras bilingue* and *R. gracile*. The Pule Hill Grit is of particular interest at this locality for containing abundant bivalve and gastropod fauna. A key locality for studies of Upper Carboniferous goniatites with important implications for stratigraphic studies of the late Namurian (Marsdenian Stage).

In layman's terms, the quarry faces and rock outcrops within this site provide excellent exposures of rocks of the Namurian Series originally formed during the Carboniferous Period of geological history, about 320 million years ago. The rocks consist of shales overlain by a thick sandstone layer known as the Pule Hill Grit, both rock-types containing fossils of particular interest. The most important fossils here are the remains of marine animals known as goniatites which can be used to accurately date the rocks for the purposes of comparison with rock sequences elsewhere in Britain and overseas. Pule Hill is the locality where two particularly useful goniatites were first found and described. This is an important site for geological study of the Namurian Series especially in respect of the fossils used for dating rocks of this age.