

Project No. 2345

**SIRIUS MINERALS PLC
WOODSMITH MINE
PHASE 3 WORKS**

**Landscape and Ecological
Management Plan**

Version: 0 FINAL

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1 INTRODUCTION

- 1.1 In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to North York Moors National Park Authority (NYMNPA) for permission to develop a polyhalite mine and underground Mineral Transport System (MTS). Planning consent was subsequently granted in 2015 subject to conditions.
- 1.2 This document has been prepared on behalf of Sirius Minerals plc (Sirius Minerals) and details a Landscape and Ecological Management Plan (the Plan) for the Phase 3 (see Paragraph 1.4 below) Works at Woodsmith Mine (formerly named Dove's Nest Farm). This document is required to partially discharge the requirements of condition 57 of NYMNPA planning permission NYM/2014/0676/MEIA. It has been prepared in accordance with current good practice and in line with all relevant environmental legislation. This planning condition states that:

Table 1: Condition NYMNPA-57 Landscape & Ecological Management Plan

Condition	Compliance with Condition NYMNPA-57
<p>Prior to the commencement of development at either Dove's Nest Farm or Lady Cross Plantation Landscape and Ecological Management Plans for each site should be submitted to the MPA and approved in writing by the MPA and works should subsequently be undertaken in accordance with them.</p> <p>These plans should relate to land within the two development sites. The plans should set out the means by which the sites will be managed for landscape, ecology and biodiversity throughout the construction and operational phases of the mine.</p> <p>Construction and operational phases shall be dealt with in separate parts of the plans. The plans should as a minimum cover the matters referred to in the Environmental Statement, the Supplementary Environmental Information, and the Design and Access Statements including their Appendices and indicate how the designs and mitigation set out in those documents shall be achieved.</p> <p>At the Dove's Nest Farm site objectives should include establishment of heathland communities on restored spoil mounds.</p> <p>The details at both sites shall include Arboriculture Method Statements and Tree Protection Plans. The Landscape and Ecological Management Plans shall include provision for reporting to the MPA and set out the process by which remedial measures that the MPA may require should the plans not be fulfilling their objectives are undertaken.</p> <p>The operational phases of the Landscape and Ecological Management Plans shall include long term management proposals throughout the operational life of the mine which will be reviewed on a regular basis, at least every two years.</p>	<p>This document is for the Woodsmith Mine site only.</p> <p>This document is for the Phase 3 works only and is ongoing throughout Phase 3.</p> <p>This document is for the Woodsmith Mine site only.</p> <p>This document is for the Phase 3 works only. No operational information is therefore included in this plan at this stage.</p> <p>This document is for the Phase 3 works only. No operational information is therefore included in this plan at this stage.</p> <p>Sections 3, 4 and 5 identify management objectives based on the ES and SEI. Sections 6 and 7 then identify management prescriptions that will be used to achieve these objectives.</p> <p>Heathland works are not included within Phase 3.</p> <p>Refer to separately submitted documents for Arboriculture Method Statements and Tree Protection Plans (Woodsmith Mine Phase 3 Arboricultural Method Statement, 2017) to discharge NYMNPA Condition 70.</p> <p>Refer to Section 8 for review process.</p> <p>This document is for the Phase 3 works only and is ongoing throughout Phase 3. No operational information is therefore included in this plan at this stage.</p>

- 1.3 This document only details the works required for the Phase 3 Works at Woodsmith Mine. It does not include any activities at Lady Cross Plantation as these works have been deferred. As there are additional construction phases to be completed, no operational information has been included in this plan. Updates to this plan will be prepared for subsequent construction phases and following any design or method change. The NYMNPAs has confirmed that they support this approach.
- 1.4 The works required for Phase 3 comprise the following:
- General site clearance including demolition of all farm buildings and sheds, and localised tree and scrub clearance, as shown on drawing 40-ARI-WS-71-CI-DR-1051.
 - Excavation and construction of the south western extension of the upper tiered working platform at around 203m AOD, as shown on drawing 40-ARI-WS-71-CI-DR-1053.
 - Excavation and construction of the Platform for the Construction Welfare Facility, Parking Area and Concrete Batching Plant, as shown on drawing 40-ARI-WS-71-CI-DR-1053.
 - Construction of temporary and permanent soil mounds, including the basal liner for a future storage facility in the northeast corner of the site for non-hazardous non-inert spoil and three topsoil, subsoil and inert material storage bunds in the southwestern area of the site, as shown on drawings 40-ARI-WS-71-CI-DR-1053 and 40-ARI-WS-71-CI-DR-1055, with earthworks volumes presented in 40-ARI-WS-71-CI-DR-1054.
 - Construction of surface water drainage, a temporary surface water attenuation pond and temporary wetland in the southern area and two permanent attenuation ponds and two wetland areas in the north eastern area, as shown on Drawing 40-ARI-WS-71-CI-DR-1050;
 - Construction of a spring and groundwater drainage layer in the north eastern area, discharging into a wetland area, as shown in drawing 40-ARI-WS-71-CI-DR-1080.
 - Installation and commissioning of temporary dewatering as shown in drawing 40-ARI-WS-71-CI-DR-1058.
 - Erection on site of the Concrete Batching Plant as shown in drawing 40-ARI-WS-71-CI-DR-1050, complete with reticulated water supplies and tanks.
 - Construction of the drilling platform and temporary saline lagoon area for the groundwater reinjection well as shown in drawing 40-ARI-WS-71-CI-DR-1057.
 - Establishment of construction welfare and security facilities - complete with hook-up of power, communications & water supplies and new waste water collection facilities as shown on drawing 40-ARI-WS-71-CI-DR-1050.
- 1.5 This Plan provides the necessary information to guide working practices on site during the Phase 3 Works. Together with similar reports, this Plan provides a suite of documents containing the information required by NYMNPAs to partially discharge this condition as it relates to the scope of the Phase 3 works.

2 MANAGEMENT PLAN METHODOLOGY, SCOPE AND RESPONSIBILITIES

Methodology

- 2.1 This Plan has been prepared using the following approach:
- identification of the context of the site and the existing and proposed content of the site (i.e. habitats and features);
 - identification of the management objectives for the site;
 - an evaluation of the site in relation to the management objectives;
 - preparation of the management prescriptions for the identified habitats and features to enable the management objectives to be met; and
 - an outline of the review requirements for future phases of development of the site in response to any changing site conditions and opportunities (should they arise).

Extent of the Site

- 2.2 The Phase 3 construction boundary is shown on drawings **2345.M1 and 2345.M2 (Appendix A)** and these are the areas to which this Plan applies. Areas outside the extent of the Phase 3 boundary, but within the management plan boundary will not be affected. In addition to works within the Phase 3 works boundary, the Belt Plantations will be managed in accordance with the current version of this Plan.

Responsibilities

- 2.3 Responsibility for the implementation of the Plan lies with Sirius Minerals and its successors. All managers, contractors, sub-contractors, and third party organisations carrying out work within the Site will adhere to the Plan. All parties have a statutory responsibility to comply with the requirements of wildlife legislation but must also comply with the aims of the Plan in relation to the protection and encouragement of legally protected species and habitats within the Site.
- 2.4 Sirius Minerals will appoint or nominate one person within each of the two principal contractors for all matters connected with the landscape and ecological management of the Site. For the Phase 3 works this will be AMC Limited and North Midlands Construction Limited.
- 2.5 The landscape and ecological design of the Site seeks to achieve a balance between visual screening and landscape integration of the Site and biodiversity protection and enhancement objectives. Should a conflict arise between these objectives, the landscape objectives will take precedence unless legally protected species will be affected, in which case the legislation afforded to the species in questions will take precedence.

3 SITE DESCRIPTION & DESIGN PRINCIPLES

Design Principles of Phase 3 Works

- 3.1 A set of design principles for the wider site is set out in the Environmental Statement (ES) and Supplementary Environmental Information (SEI), which accompanied the planning application. For the purposes of Phase 3, the relevant design principles are considered here.
- 3.2 During the Phase 3 works, the following landscape works will be undertaken as part of the environmental mitigation for the project and will therefore form the focus of this document.
- seeding of the soil storage mounds to protect the soil resource and to help visually mitigate the construction works through rapid greening up of the storage mounds;
 - maintenance of grass cover over parts of the site where soils are yet to be stripped;
 - seeding of surface water swales and the banks of the temporary settling ponds to help reduce soil erosion and subsequent impact on water quality; and
 - inoculation of wildlife and SuDS polishing ponds with native plant species and encouragement of natural colonisation.
- 3.3 In addition to the above, several other landscape elements will be implemented as part of the Phase 3 works to mitigate construction impacts:
- screening of close range views from the B1416 to construction operations at the north west corner of the Site, through the use of mounding. This mounding will initially be seeded to grass and then adapted into the final landform as construction proceeds; and
 - screening of close range views from the B1416 through the Belt Plantations, in winter, to construction works, through the use of new permanent understorey planting.

4 MANAGEMENT OBJECTIVES

4.1 The primary objectives for the Phase 3 works as determined during the environmental impact assessment are as follows:

Objective 1

- *Assist in the mitigation of Phase 3 works including protection of soil resources, water management and visual mitigation of B1416 views;*

Objective 2

- *Protect and retain existing mature woodland cover where possible to provide visual screening during the mine construction phase.*

5 EVALUATION OF SITE IN RELATION TO OBJECTIVES

Objective 1

- *Assist in the mitigation of Phase 3 works including protection of soil resources, water management and visual mitigation of B1416 views;*
- 5.1 The objective for protecting soil resources and visually mitigating soil storage mounds will be met by establishing a dense grass sward on soil storage mounds as soon as practicable after they have been formed. Some areas of existing grassland will remain within the Phase 3 construction boundary. Soils within these areas will not be stripped until later phases of the project. Existing unstripped areas would be retained as grassland and cut to prevent establishment of undesirable weed species and to assist in the management of protected species (e.g. reptiles) within the site.
- 5.2 The objective for assisting water management and providing ecological benefits along temporary watercourses will be met by establishing a grass and wildflower seed mix on banks and disturbed areas as soon as practicable after they have been formed. Wildlife and polishing ponds would be inoculated with wetland planting, in addition to encouraging natural colonisation.
- 5.3 The objective for assisting visual mitigation will be met by implementing mounding near the northern site entrance and through enhancing the understorey layer of the Belt Plantations, all to reduce construction visual impact in close range views from the B1416. This is an integral part of the design and allows for the sustainable reuse of excavated material on site.

Objective 2

- *Protect and retain existing mature woodland cover where possible to provide visual screening during the mine construction phase.*
- 5.4 This objective will be met by implementing tree protection plans as required and set out in the Arboricultural Method Statement produced to partially discharge Condition NYMNP-70. Management operations within the Belt Plantations will be undertaken to ensure the visual screening value of these woodlands is maintained during the Phase 3 works. For example, the removal of sycamore will only be undertaken where the remaining tree cover continues to provide effective screening. Management operations within Haxby Plantation and Whinny Wood will be undertaken as set out in the woodland management plan (Haxby Plantation, Belt Plantations and Whinny Wood Management Scheme, York Potash, 2016).

6 MANAGEMENT PRESCRIPTIONS – PHASE 3 WORKS

- 6.1 During the Phase 3 works a number of landscape features will be created. These will be subject to the management prescriptions as described below.
- 6.2 Existing landscape features that will be protected and retained as part of the permanent restoration proposals for the site (for example the Belt Plantations) would be managed from the outset of the Phase 3 works in accordance with the Other Areas management prescriptions as set out in Section 7.

Soil Storage Mounds

- 6.3 Areas and Quantity:

- Phase 3 – 6ha.

- 6.4 Management Prescription:

CM1 Seeding and Maintenance of Soil Storage Mounds and B1416 Mound

- At the first horticulturally sound opportunity (i.e. spring or autumn sowing periods) after formation of soils storage mounds cultivate and sow with grass mix as set out at Appendix 1.
- Undertake first cut when the sward reaches 75mm height, taking into account the requirements of the Protected Species Management Plans and the CEMP prepared for the Phase 3 Works (conditions NYMNPA 52 and 93 respectively).
- Maintain sward at 100-150mm height including cuttings to be removed.
- Prevent the establishment of pernicious, invasive or notifiable weed species (e.g. Creeping Thistle, Nettle, Dock, Ragwort, Himalyan Balsam, Japanese Knotweed, Bracken).
- Kill grass cover including root systems using suitable chemical methods prior to removal of mound for use in restoration. This work will be undertaken by qualified personnel and undertaken in accordance with all relevant environmental, and health and safety legislation.

Swales and Settling ponds

- 6.5 Areas and Quantity:

- Phase 3 – 4.2ha.

- 6.6 Management Prescription:

CM2 Seeding and Maintenance of Swales and Settling Ponds

- At the first horticulturally sound opportunity after formation of swales and settling ponds cultivate and sow banks and adjoining bare soils with a grass and wildflower seed mix (comprising of locally common species) obtained from local sources. The source will be agreed in advance with NYMNPA ecologist.
- Undertake first cut when the sward reaches 100mm height taking into account the requirements of the Protected Species Management Plans and the CEMP prepared for this phase of the works (conditions NYMNPA 52 and 93 respectively).

- Undertake annual cut (in late summer after wildflower seed has set and fallen) for the duration of the swale or pond. The grass/wildflower cuttings should be removed from site.

Wildlife Ponds and Polishing Ponds

6.7 Areas and Quantity:

- Phase 3 – 0.2ha.

6.8 Management Prescription:

CM3 Inoculation of Wildlife Ponds and Polishing Ponds

- At the first horticulturally sound opportunity after formation of ponds plant pond edge with the inoculation planting mix as set out at Appendix 2.
- Allow natural colonisation of ponds to occur.

Unstripped Grassland Areas

6.9 Areas and Quantity:

- Phase 3 – undefined area, to include all unstripped existing grassland within the Phase 3 boundary.

6.10 Management Prescription:

CM4 Management of Grassland Areas Prior to Stripping

- Maintain sward at a maximum height of 150mm above ground levels, cuttings to be removed.
- Works to be carried out in line with requirements set out in the Phase 3 Reptile and Bird Protected Species Management Plans (Royal HaskoningDHV, March 2017).

7 MANAGEMENT PRESCRIPTIONS – OTHER AREAS

7.1 The following section describes the proposed management of areas that lie outside the Phase 3 Works boundary but which are to be managed to provide mitigation of construction works as set out in the ES and SEI. Management methods are set out as a series of Management Prescriptions for each type of habitat or feature and have been developed to meet the objectives set out for the Site in Sections 4 and 5. Quantities of each type or feature to be managed have been measured from drawing **2345.M2** and are included for use by the Contractors.

7.2 Prescriptions are based on knowledge of the current site and proposed restoration scheme. As identified in Section 8, these prescriptions should be viewed as flexible and should be adapted in response to changing future priorities and conditions, whilst remaining in line with the primary management objectives identified in Section 4.

General Inspection, Safety and Security

7.3 Areas and Quantity:

- All other areas.

7.4 Management Prescription:

M1 Site Inspection, Safety and Security

- Inspect the site at six month intervals to check for general condition, boundary security and for general safety hazards including dangerous trees and branches, blocked drainage routes and surface wear/ erosion.

Belt Plantations - New Planting

7.5 Management works within the Belt Plantations are described at high level in the woodland management plan (Haxby Plantation, Belt Plantations and Whinny Wood Management Scheme, York Potash, 2016). Detailed management operations are set out in this Plan.

7.6 Within the Belt Plantations new understorey planting shall be undertaken as part of Phase 3 Works and shall comprise the following species mix:

Native Species Understorey Planting Mix (Belt Plantations), average density 1500nr plants/ hectare, planting selectively in gaps to reinforce understorey screening value				
Botanical Name	Common Name	%	Size (cm)	Type
<i>Corylus avellana</i>	Hazel	40	60-90	BR
<i>Ilex aquifolium</i>	Holly	30	30-45 min 3 breaks	2L
<i>Crataegus monogyna</i>	Hawthorn	25	20-40	BR
<i>Sorbus aucuparia</i>	Rowan	5	45-60	BR

7.7 Understorey planting shall be subject to Management Prescriptions M2, M3, M4, M5 and M6 during the five year period after planting.

7.8 Areas and Quantity:

- Belt Plantations 5.3ha

7.9 Management Prescriptions for new planting in the Belt Plantations:

M2 Weed Control

- For a period of five years after planting or until the canopy closes, the ground around newly planted trees and shrubs should be kept weed free, to a diameter of 900mm at each plant. This may be by use of an approved herbicide, or approved mulch or mulching mat.

M3 Firming and Inspection

- Check newly planted trees and shrubs for windrock during period after planting and firm as necessary. Consider hard cutting back to encourage bushy habit in exposed areas or where ground conditions prevent adequate firming. Inspect at beginning and mid-way through growing season for signs of disease or nutrient deficiency and correct as necessary using the minimum application of fertiliser as a spot treatment.

M4 Beating Up

- In accordance with condition NYMNPA 71, any new planting and up to the first ten years after planting, individual trees and shrubs that have either failed or are failing to thrive will be replaced with the same species. If wholesale failure of a particular species occurs the reason for failure will be determined and the problem rectified or the species should be replaced with plants of a species which are establishing successfully in the vicinity.

M5 Plant Protection Measures

- To prevent damage to young plants they will be established within approved type grow tubes and shelters. Plant protection measures will be regularly inspected for damage or lack of support and any problems made good with immediate effect. Consideration to remove shelters and guards at the end of year 3-5 after planting will be taken; by this time tree and shrub species should be sufficiently well-established to resist rabbit or vole damage. All removed protection and support material will be taken off site.

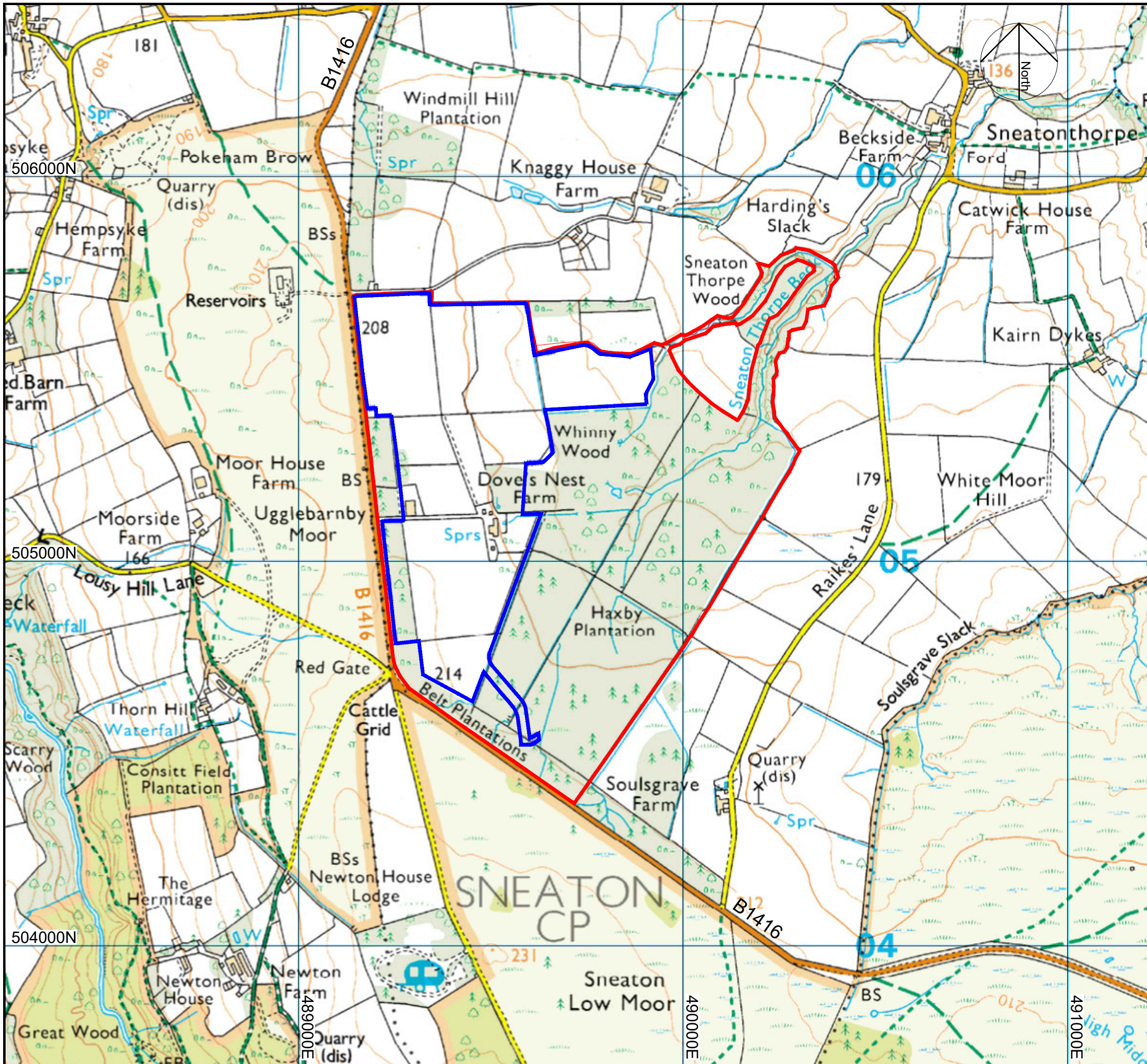
M6 Establishment Pruning

- During the establishment period, pruning of tree species will be carried out as necessary during the first three years after planting to remove all weak, dead, diseased or damaged branches or those rubbing or crossing one another.


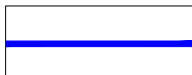
8 REVIEW

- 8.1 This Plan will be reviewed and updated prior to the start of each phase of construction.
- 8.2 An annual Site management inspection will be undertaken by Sirius Minerals, with a report to be issued to NYMNPA setting out issues or changes that have occurred in the preceding year and actions that will be undertaken in the following year.
- 8.3 Key issues to be considered during Site inspections include:
- management plan response to ongoing ecological monitoring (being undertaken in connection with general Site mitigation works);
 - monitoring of weed control and plant establishment in new planting areas;
 - monitoring of plant protection and support measures;
 - progress of existing mature woodland management operations including understorey development, ground flora diversification and removal of alien/invasive species;
 - inspection of mature trees in respect of public and worker safety, particularly along outer Site/ highway boundaries;
 - maintenance of clear sightlines at highway entrances to the Site;
 - review of need for clearance of pond vegetation and rotational cutting back of marginal areas and ditches; and
 - inspection of the condition of ditches, with emphasis on checking for bank stability and obstructions.

Drawings



KEY

-  Land ownership boundary
-  Phase 3 Works boundary

Revision 04. 2017/03/31. Updated to latest works boundary
 Revision 03. 2017/03/09. Phase 3 works boundary indicated
 Revision 02. 2017/01/16. Minor boundary amendment
 Revision 01. 2017/01/06. Key amended, phase 2 works boundary indicated

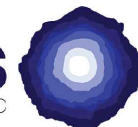
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 Landscape & Ecological Management Plan

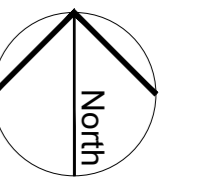
Drawing Title
 Location Plan

Scale
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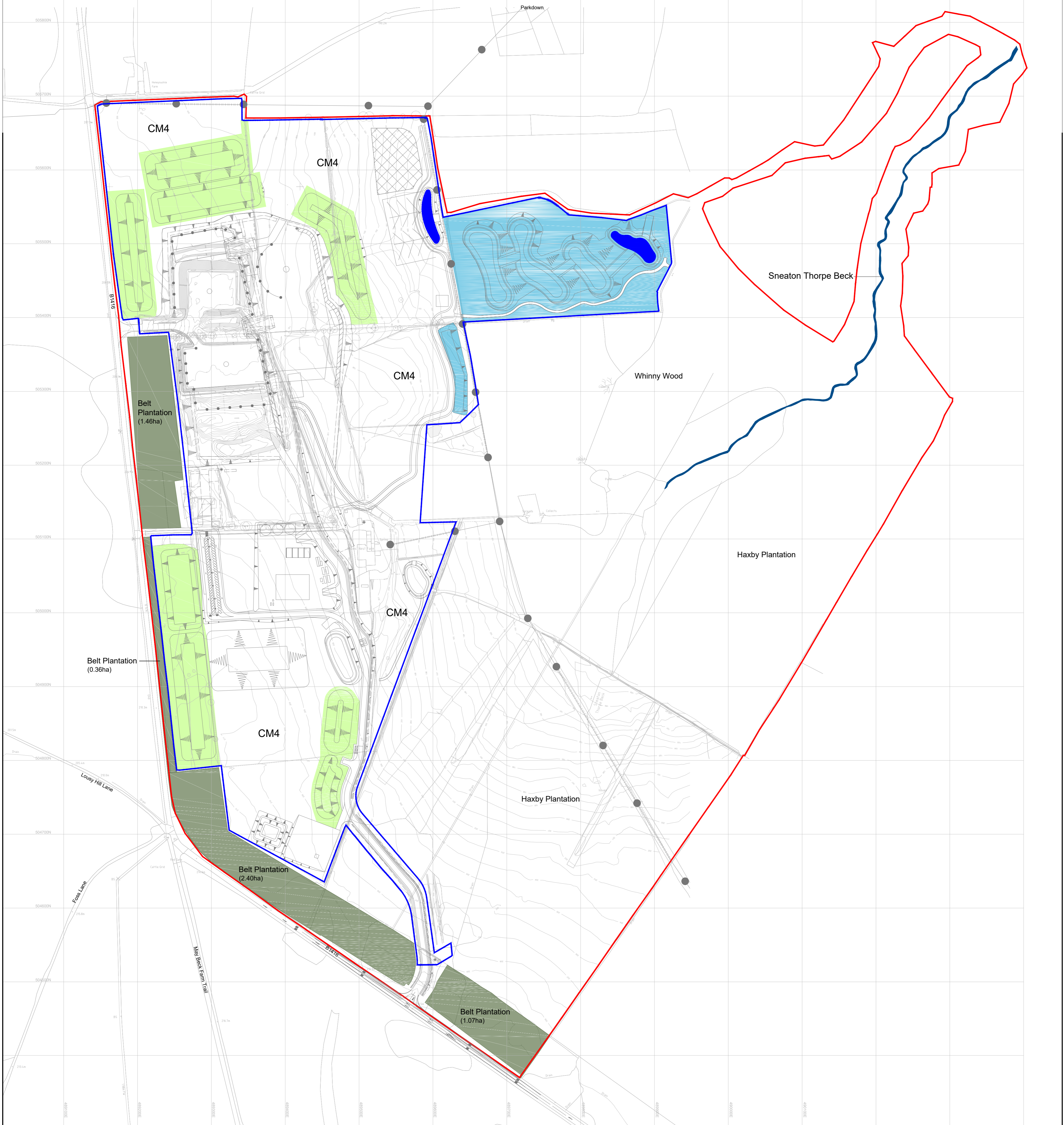
Number
 2345.M1

Revision
 04

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0 50 100m



KEY

- Land ownership boundary
- Phase 3 Works boundary
- Existing contours (at 1m intervals)
- Proposed soil storage mounds grassland (CM1)
- Proposed wetland grassland (CM2)
- Proposed inoculation of Wildlife & Polishing Ponds (CM3)
- Existing grassland areas prior to stripping (prescription applies to all undefined areas within Phase 3 boundary)

Revision 02. 2017/03/31. Updated to latest layout
 Revision 01. 2017/03/09. Phase 3 works indicated



Project:
 Woodsmith Mine
 Landscape & Ecological Management Plan

Drawing Title:
 Construction Phase (Phase 3)
 Management Prescriptions

Drawing Number: 2345.M2	Revision: 02
Scale: 1:2500 @ A1	Date: March 2017
Drawn: BB	Checked: SW
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Appendices

Appendix 1

Seed Mixes for Soil Storage Mounds and Swales/ Settling Ponds

Woodsmith Mine – Additional Seed Mixes

1. Seed Mix for Temporary Topsoil and Subsoil Storage Mounds (apply granular NPK (6:9:6) pre seeding fertiliser at a rate of 50gms/ms prior to sowing, example product type BSH1 Pre-Seeding Granular, available from Germinal GB, Camp Road, Witham St Hughs, Lincoln, LN6 9QJ)

Topsoil and subsoil storage mounds sowing mix (sowing rate 25gms/m²)		
30%	Crystal	Hard Fescue
25%	Disco	Perennial Ryegrass
20%	Franklin	Strong Creeping Red Fescue
10%	Panduro	Smooth Stalked Meadow Grass
10%	Highland	Browntop Bent
5%	Huia	White Clover

2. Seed mix for swales and pond edges (no fertiliser to be applied)

Local seed mix to be obtained from source to be agreed with NYMNPA ecologist. Sowing rates to be agreed.

Note prepared: 24 November 2014 and revised 30 March 2017

Appendix 2

Wildlife Pond and Polishing Pond Inoculation Planting Mix

York Potash Project – Wetland Inoculation Planting Mix

The edges of wildlife ponds and SuDS polishing ponds are to be inoculated with emergent and marginal planting to provide initial cover whilst preventing dominance by Soft rush and allowing potential for natural colonisation.

Wetland Edge Planting Mix (2 plants/m² based on a 2m wide band around pond edges and equal numbers of all species)		
Botanical name	Common Name	Size/ type
Emergent areas (100-200mm water depth)		
Alisma plantago-aquatica	Water plantain	9cm pot
Caltha palustris	Marsh marigold	9cm pot
Carex acutiformis	Lesser pond sedge	9cm pot
Iris pseudacorus	Yellow flag	9cm pot
Lythrum salicaria	Purple loosestrife	9cm pot
Mentha aquatica	Water mint	9cm pot
Myosotis scorpiodes	Water forget-me-not	9cm pot
Ranunculus flammula	Lesser spearwort	9cm pot
Sparganium erectum	Branched bur-reed	9cm pot
Marginal areas (+/- 25mm above and below design water level)		
Cardamine pratensis	Cuckoo flower	9cm pot
Carex nigra	Common sedge	9cm pot
Filipendula ulmaria	Meadowsweet	9cm pot
Lychnis flos-culi	Ragged robin	9cm pot