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ENERGYBUILD LIMITED

ABERPERGWM COLLIERY MINE WASTE REPOSITORY

PLANNING PERMISSION REF. P2014/0729

AFTERCARE SCHEME TO DISCHARGE CONDITION 72

OCTOBER 2023

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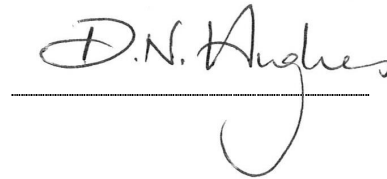
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1 INTRODUCTION

- 1.1 Wardell Armstrong LLP have been instructed by Energybuild Limited to prepare a written scheme of Aftercare for the Mine Waste Repository (MWR) in accordance with Condition 72 of planning permission ref. P2014/0729, granted on 27th September 2018 by Neath Port Talbot County Borough Council, as the mineral planning authority.
- 1.2 This Aftercare Scheme sets out in detail the requirements as may be necessary in order to establish the arrangement of vegetation shown on Drawing number **CA12936/007** '**Proposed landscaping scheme**' to bring the land to the required standard for use for amenity and forestry.
- 1.3 Details of the tree planting and seed mixes, the source of seed and planting stock, the methods of sowing and planting and the timings of operations are included in this written Scheme.
- 1.4 The Scheme incorporates the comments of Dr. Barry Stewart regarding the establishment of Deciduous mixed woodland, scrub control on acid grassland and heathland areas, provision of log piles and ponds. Dr. Stewart's proposals have been approved by Neath Port Talbot County Borough Council's ecologist. The updated Scheme also removes all reference to planting of hawthorn as requested by the Council's ecologist.

2 CULTIVATION PRACTICES

(For the preparation of the colliery discard, soils and subsoils)

2.1 Soil strategy

- 2.1.1 The soil resources potentially available for use in the restoration (which totals 525,301m³) to the vegetation types contained within the proposed landscape scheme is summarised in Appendix 1 'Soil use and management for the restoration of the Mine Waste Repository'.
- 2.1.2 The table is divided into two parts, Part 1 confirms the available soil resources, while Part 2 shows the proposed construction of restored soil profiles for each vegetation type together with the soil volume that would be required to provide the thickness of layers indicated based on the area of each vegetation type.
- 2.1.3 The analysis indicates that the soil resource is sufficient to provide 950 mm deep soil profiles for both Commercial plantation (Sitka spruce) and Amenity woodland (Scots pine with downy birch and rowan) and 400 mm deep for Conservation grassland (mosaic of wet and dry acidic grassland).
- 2.1.4 The soil resource is sufficient to allow all soil profiles to be constructed using peat / subsoil composite exclusively as an upper layer with the small balance of surplus deep peat used only exceptionally for this purpose. The deep peat requirements for the construction of Peat bog 1, the Satellite to Peat bog 1 and the Extension to Peat bog 2 within the Conservation Area on Nant y Mynydd and the construction of Bog 5 within MWR are also identified in Part 2 of the table. The thickness of peat in each additional bog and the volume of peat to be deposited are indicated together with corresponding figures for clay to be used for lining the containment structures.

2.2 Soil profile construction

Colliery Discard

- 2.2.1 Colliery discard will be deposited, spread and levelled in accordance with the rules established for tipping in order to construct the landform illustrated on Drawing number **CA12936/006 'Proposed final landform, slope gradients, surface water drainage system and access arrangements'**. Thereafter the drainage system, or that part of the system associated with the phase of the development being restored will

be constructed in order to ensure that soils once placed will be adequately protected from scour and erosion and not at risk of slumping.

- 2.2.2 The colliery discard that is deposited within the MWR will provide the sub grade upon which the recovered natural soils will be reinstated. However, the discard itself has the potential to be used as a soil-forming material and comprise at a least a part of the reconstructed soil profiles.
- 2.2.3 Samples of discard originating from the 18ft seam were taken from the Aberpergwm Mine in October 2009 and subject to analysis. The results showed both fresh and weathered samples to be generally chemically benign. Detailed acid-base accounting indicated there to be little acid generating potential and the iron pyrites content was considered, on the basis of the results, to be low (although no direct measurement was carried out). The discard was found to possess no net neutralising requirement, indicating that pH was likely to remain at or above neutral even when subject to advanced weathering.
- 2.2.4 The colliery spoils are mechanically derived and consist exclusively of small stones (6-20 mm) and medium stones (20-60 mm) when fresh, but weather to generate a clay matrix. The materials retain an open texture when loose tipped and the porosity lends the material the ability to retain significant reserves of moisture (up to 10% when fresh).
- 2.2.5 The colliery discard has the potential to be used as a soil-forming material to augment the available natural soil resources. Its use as lower layer in the construction of soil profiles for forestry and woodland is likely to be most advantageous by providing opportunities for structural root development below the depth that could otherwise ordinarily be achieved by the recovery and reinstatement of natural soils and by bolstering water storage.

Soil Profiles

- 2.2.6 Soil profiles will be constructed by loose tipping. The distribution of soil profiles and details of their construction are shown on Drawing number **CA12936/008 'Proposed restored soil profiles'**. The method of construction for soil profiles will depend on slope gradients and the access available for articulated dump trucks.

Soil Profile 1 (400mm Peat/Subsoil Mix)

- 2.2.7 The construction of Soil profile 1, which is generally located on slopes of less than 10%, will follow the now conventional narrow strip system that allows soils to be deposited, spread and levelled using a tracked excavator without traversing the soil surface. Soil-forming material (rock regolith) will be spread using a bulldozer to produce a 75 mm thick 'blinding' layer over the graded landform immediately prior to soil profile construction. The contoured and profiled fill surface will be ripped downslope using winged tines pulled by a D6 bulldozer, in strips 6.0 m wide to a depth of 400 mm in order to relieve compaction within the soil-forming material and colliery discard. Large stone (>150 mm in any dimension) visible on the ripped surface and liable to intrude significantly into the final cover will be removed. Trucks will reverse downslope up to the edge of the strip (which will be orientated parallel to the dip of the slope) and tip peat / subsoil composite in conical mounds. The spacing between the mounds will allow for a final 325 mm soil thickness to be achieved. An excavator, fitted with a toothed digging bucket, standing on the fill surface immediately behind the edge will spread the material to the required thickness and in the process remove obstructions greater than 150 mm in any dimension from the surface. The final surface shall be left generally free of significant (>50 mm) depressions and high spots but not graded flat in order to slow the shedding of surface water and to encourage infiltration.

Soil Profile 2 (900mm Peat/Subsoil composite)

- 2.2.8 The construction of Soil profile 2, which is generally on slopes of greater than 10% and up to 33%, will be accomplished by a modified form of loose tipping. The fill surface will once again be ripped downslope, and obstructions removed but dump trucks will deposit the peat / subsoil upon berms, which are positioned at regular intervals to divide the batters. A tracked excavator working from upon the fill surface alongside the ripped strip will 'haymake' the soils onto the ripped colliery discard and into position to achieve a final soil profile 950 mm in thickness. The removal of obstructions and the surface finish shall be as per Soil profile 1.
- 2.2.9 Areas upon which soils are reinstated will be protected from loss, damage and contamination with colliery discard by the excavation of drainage ditches and /or bunds to provide a physical barrier to encroachment by equipment.

3 VEGETATION ESTABLISHMENT

3.1 Establishment of Conservation grassland

- 3.1.1 Conservation grassland, which will comprise a mosaic of wet and dry acidic grassland, will be established using the seed mix presented in **Appendix 4** 'Seed mix for conservation grassland – mosaic of wet and dry acidic grassland'. The Conservation grassland will be established on a peat / subsoil composite with a relatively low ratio of peat to subsoil (<1:1) and the substrate will as a result be relatively free draining, moderately acidic and reasonably fertile. Species selection within the seed mix reflects these soil properties and is designed to provide a composition comparable to that of semi improved pasture, however, the low sowing rate of 60 kgs ha is intended to do no more than bind the surface to reduce the risk of erosion and scour and to allow an open low density sward to develop. The approach is designed to ensure that the opportunity is presented for natural colonisation to occur and species which prove most adaptable to emerge to form a diverse stable vegetation community over an extended period.
- 3.1.2 Grass seed will be obtained from a reputable supplier with seed certificates obtained to confirm the provenance of material. The Conservation grassland seed mix will be sown by hand and the soils will receive a light application of inorganic preseeding fertiliser in advance (60 kgs ha 16:16:16 NPK). However, no agricultural type cultivation will be carried out to prepare a seed bed. Experience has shown this serves to increase the proportion of water that forms surface water runoff, at the expense of that infiltrating into soil profiles. Increasing the amount and speed of surface runoff heightens the propensity of loose tipped soils to scour and erosion. Sowing will be extended to cut and fill slopes above and below berms and to verges along forest roads where this is likely to aid stabilisation.
- 3.1.3 Newly planted Commercial forestry plantation and Amenity woodland will not be sown with a grass seed mix. Soils reinstated on restored areas will be well protected by the highly effective surface water drainage system and in particular the arrangement of berms to intercept surface runoff. In addition the loose tipped soil profile and ungraded surface areas will encourage the infiltration of surface water and medium term storage. The concurrent establishment of trees and grass i.e. planting and seeding in the same season is widely held to be counter productive. Establishment of a grass sward creates an environment of intense competition for nutrients, moisture and light, in which invariably grasses are the most successful. Trees and

shrubs consequently show higher mortality and depressed vigour. For these reasons seeding of planting compartments will be deferred until year 3 of the aftercare period, though natural recolonisation may prove to make this unnecessary.

3.1.4 Seeding will be carried out in the period April-September inclusive in any year.

3.2 **Establishment of Commercial forestry plantation and Amenity woodland**

3.2.1 The landscape scheme contains two separate planting mixes and these are Commercial forestry plantation comprised of Sitka spruce and Amenity woodland comprised of Scots pine with minor downy birch and rowan. **Appendix 5** 'Forestry and woodland planting mixes' contains details of the plant spacing and stocking density together with a breakdown of plant numbers by compartment.

3.2.2 Planting stock will be obtained from nurseries within South Wales and/or Herefordshire. Sitka spruce will be supplied as 2+1 20-30 cms bare rooted transplants, Scots pine as 1 year old 110 cc 15-20 cm cell grown plants. Downy birch and rowan will both be supplied as 1 year old 175 cc 30-40 cm cell grown plants

3.2.3 Planting will be carried out at the end of each planting season (February/March) to ensure all available soiled areas are included and also because planting after Christmas appears anecdotally to promote better survival.

3.2.4 The trespass of sheep within Forest Enterprise blocks remains a perennial problem. The incidence of damage has declined in recent years due to the policy of impoundment operated by the Natural Resources Wales within the Rheola Forest Block.

3.2.5 Broadleaved trees will be fitted with tree shelters to assist establishment and to provide protection from browsing. Conifers will not be protected initially but the requirement for fencing will be reassessed in the event of significant damage occurring to trees.

3.2.6 It should be noted that satisfactory establishment of Sitka spruce has been achieved on Forest Quarry without fencing since 2009.

Deciduous mixed woodland creation

3.2.7 In addition to the 30.4ha of commercial forestry, scheduled to be planted with 99% Sitka Spruce *Picea sitchensis*, a further 8.9ha of amenity woodland is scheduled to be planted with open 90% Scots Pine *Pinus sylvestris* with the remaining 10% made up

with Downy Birch *Betula pubescens* and Rowan *Sorbus aucuparia*. Natural recruitment of Grey Willow *Salix cinerea* is likely to be high with occasional oaks *Quercus* spp.

3.3 Further development of Nant y Mynydd Conservation Area

3.3.1 The peat resource identified within the Additional land to the east of FQ2E presents the opportunity to build upon the success of the mitigation scheme which was implemented in order to permit development of the Forest Quarry 2 Extension OCCS. While the principal voids which remained after sandstone quarrying within 'Area 1' were utilised in the course of constructing Bogs 2, 3 and 4 within the Nant y Mynydd Conservation area a number of additional opportunities have been identified for bog construction within this area and these are identified on Drawing number **CA12936/005 'Further development of Nant y Mynydd Conservation Area'**.

3.3.2 Wardell Armstrong carried out a desktop survey in August 2013 to identify opportunities to construct containment structures capable of providing drainage conditions conducive to the preservation of peat and the creation of bog habitat. The survey reaffirmed the suitability of the defunct opencast void known colloquially as 'Lake Windermere' for conversion into a peat bog and suggested that lining the structure might not be necessary and potentially counterproductive given the base groundwater flow.

3.3.3 The survey identified that any further peat bogs would require excavation to create containment structures and that this would be constrained by the topography of the existing ground surface, the occurrence of sub-cropping sandstone and the presence of recovering heathland over much of the area.

3.3.4 Notwithstanding these difficulties a number of opportunities have been identified. The potential exists to extend Bog 2 to the west into an area which is currently used for soil storage but which will become available once the soils have been removed and reinstated on the former Sarn Helen OCCS in preparation for woodland planting. This work is planned for Summer 2014. In addition it has been concluded that a further satellite bog can be constructed on the western flank of the area in a natural hollow. The proposed satellite bog encroaches in part onto retained heath but could be constructed with minimal damage by carrying out the works from the western side and translocating vegetation turfs that are within the excavation area and positioning these on ground to the immediate north which is previously disturbed but which retains natural subsoils.

- 3.3.5 The arrangement of existing and proposed peat bogs is indicated on Drawing number **CA12936/005 'Further development of Nant Y Mynydd Conservation Area'** and this shows that that it would be possible to link Peat bog 4 which presents an outflow with a near continual base flow to the Extension to Peat bog 2 and in turn to Satellite Peat bog 1 and Peat bog 1 and in so doing to augment the volume of water which reaches each structure by surface runoff. It should be noted that the dedicated drainage proposed between the peat bogs is designed to avoid cross contamination with drainage from the haul road to the west and also presents benefits in terms water chemistry. The opportunity exists to provide a dedicated outfall from Peat bog 1, via a culvert across the haul road, onto Sarn Helen to rejoin an existing stream tributary on natural ground.
- 3.3.6 The capacity for preservation of peat by the construction of additional peat bogs within the conservation area on Nant y Mynydd is 21,960m³. However, this represents only approximately 40% of the total volume of 53,300m³ of deep peat expected to be encountered in the course of extending the Mine Waste Repository into the Additional Land to the east of FQ2E. In order to maximise the preservation of peat it is proposed that an additional facility, 'Peat bog 5' will be developed at the northern part of the MWR in the closest proximity possible to the Conservation Area, approximately 300 m to the southwest of Peat bog 4.
- 3.3.7 Peat bog 5 will be constructed by engineering of the colliery discard to create a scalloped 'basin' feature and this will be lined with an 'extra over' thickness of 500 mm of clay to minimise the risk of seepage from the bog into the fill below, although it should be noted that the thickness of colliery discard deposited within the area identified will be relatively shallow. Peat bog 5 will be designed to allow the permanent emplacement of a further 21,000m³ of pristine peat. The outstanding balance of 9,000m³ will be used for the re-establishment of forestry. The cell for Peat bog 5 will be developed in the course of tipping within Phase 6 of the development and will immediately precede disturbance of the deep peat deposit within Phase 7 to the immediate south-east.
- 3.3.8 New peat bogs will be constructed as per the methodology developed for Peat bogs 2, 3 and 4 which draws upon the engineering of containment cells on landfill sites, with side slopes to cells graded at no steeper than 33% and a 250 mm minimum thickness clay lining (500 mm for Peat bog 5 to reflect its location on the tip itself). This will be constructed in two layers with stones and obstructions present in the clay

removed by hand. The clay will be maintained at the optimum moisture content to achieve the required plasticity for effective compaction. A sheep's foot roller will be used to compact the clay. Deep peat will be removed from within the Additional land to the east of FQ2E and specifically from the unafforested section which contains up to 2,800 mm pristine peat. This is considered to provide the best peat resource as it does not contain tree stumps and hosts a remnant bog community that includes Sphagnum Sp and Eriophorum Sp. An excavator, which will be operated as a 'face shovel' will lift blocks of peat from their base and attempt in so doing to maintain the vegetation cover intact. Peat will be deposited directly into the pre constructed containment cells with double handling thereby entirely avoided. The peat will be maintained at or close to saturation throughout. The presumption will be to replace, as far as practicable, blocks upright to maintain the viability of the vegetation and encourage recolonisation of any adjoining bare peat surfaces.

3.3.9 Peat recovered during Phases 1 and 2 of the development will be used to fill Peat bog 1 and the Satellite Peat bog 1 within the Conservation area on Nant y Mynydd within the first 5 years of the operation of the MWR. Peat recovered during Phase 7 will be used to fill the Extension to Peat bog 2 on Nant Y Mynydd and Peat bog 5 within the MWR itself and this will take place after approximately year 20. If tipping within the MWR ceases prior to this date the peat deposit will remain undisturbed and the entire area occupied by Phase 6 will be restored instead to grassland. The soil resource contains sufficient 'float' to readily accommodate this change.

3.3.10 The four additional peat bogs have the capacity to receive 43,582 m³ of peat, which would bring the total quantity of peat protected within the overall development since 2011 to 97,458 m³. The MWR would result in a further 23,580 m² of bog habitat being created bringing the total area to 5.5 ha. It should be noted that all peat utilised in the scheme to date been removed from beneath commercial forestry plantation that has been severely degraded by forest operations, including deep ploughing and drainage over an extended period. The use of this peat to create new habitat provides a significant ecological gain to the development.

3.4 Provision of Log Piles

3.4.1 Habitat enrichment is to be supported by the creation of a network of log and brash piles. The log piles will primarily be aimed at providing refuges for amphibians and reptiles, but a wide range of other wildlife will benefit, such as small mammals, Hedgehog *Erinaceus europaeus*, Weasel *Mustela nivalis*, saprotrophic invertebrates

and fungi. Log pile locations will be selected to make use of the naturally occurring habitat corridors and designs will be varied to increase the availability of niches.

3.5 Provision of areas of bare ground to replace Section 7 habitat losses

- 3.5.1 During the operational phase of the development, a single unit of open ground extending to 13.5 ha has been set aside for ground-nesting birds, as indicated on Drawing number **CA12936/009 'Proposals for Ecological Conservation During Operation of the Mine Waste Repository'**. As with similar parcels of land within the MWR site, which have been left unattended during the operational phase, it is likely that natural succession of grassland and heathland will develop an open mosaic of habitats. The development of such vegetation will make the area attractive to species such as Meadow Pipit, Skylark and Nightjar for a period of at least 10 years. The habitat is to be managed by implementing a cutting regime to control the development of scrub and rush-dominated vegetation. It may be necessary to rejuvenate the habitat mosaic at some point by undertaking piecemeal ground clearance, the aim being to create patches of bare ground as part of the habitat mosaic. Habitats should incorporate a variety of substrates available from within the MWR, including carbon-rich materials derived from coal spoil.

5 VEGETATION MAINTENANCE

5.1 Maintenance of conservation grassland

- 5.1.1 The presumption will be to avoid fertiliser application other than that strictly necessary to establish an open grass sward. The application of additional fertiliser is likely to prove prejudicial to natural colonisation by stimulating vigorous grass growth and producing a closed sward.
- 5.1.2 Areas which fail to establish sufficiently well to stabilise the soil surface, and that as a result, prove susceptible to scour and erosion, will be over seeded, or if failure is complete, entirely reseeded. In the event of on-going difficulties occurring in establishment, that cannot be attributed to frost or drought, the cause of failure will be investigated by laboratory analysis of soil samples and remedial action (lime or fertiliser application) taken.
- 5.1.3 Newly established grassland will not be subject to grazing and any trespassing sheep will be removed by shepherding to allow natural recolonisation to proceed and to prevent soil structural damage. These measures should prevent the development of rush, but annual cutting and contact herbicide application e.g. 'Roundup' will be carried out to prevent spread of the species and maintain the viability of the grassland as habitat for ground nesting birds. The same measures will be implemented to control the development of scrub and to remove willow and bramble

5.2 Maintenance of newly planted trees

- 5.2.1 Weeding will be carried out in order to reduce competition between grass and trees and prevent suppression by broadleaved weeds. Contact herbicides e.g. 'Roundup' containing glyphosate or 'Checkmate' containing sethoxydium will be applied, if required, during the summer months. Residual herbicide e.g. 'Kerb Flowable' containing propyzamide will be applied, if required, during the winter months. A guard will be used, where necessary, to prevent trees being adversely affected by chemical during the application of contact herbicide.
- 5.2.2 Herbicides will be applied to control weed growth at individual planting positions. The effectiveness of herbicide application will be maximised by:
- applying herbicides at application rates appropriate to the weed vegetation,

- timing the application of herbicide correctly, paying particular attention to the growth stage of weeds,
 - assessing the weed species composition and selecting an appropriate herbicide,
 - taking full account of this information, avoiding spraying when rain is a possibility which may result in repeat application,
 - avoiding spraying in periods of drought when vegetation is least responsive.
- 5.2.3 The presumption will be to minimise herbicide use to that which is strictly necessary to ensure the survival of trees as research has shown that many chemicals, including those containing glyphosate, inflict severe damage to soil microflora.
- 5.2.4 Hand weeding will be carried out to remove pernicious weeds e.g. ragwort and also to clear vegetation from around planting positions to allow trees to be sprayed safely without risk of damage by dripping chemical.
- 5.2.5 No expectation exists of there being a requirement for watering given the high rainfall of the area and relatively good moisture retention of the peat / subsoil composites proposed for use on forestry and woodland areas. Notwithstanding this, consideration will be given to watering if not to do so risks the comprehensive failure of the new planting, subject to there being water available for this purpose (the site operation would have first call on water in lagoons to meet the requirement for dust suppression).
- 5.2.6 Trees will be monitored throughout the growing season in order to identify visual symptoms of nutrient deficiencies, especially potassium, and imbalances between nutrients. Those that appear straightforward will be managed by the top dressing of an appropriate straight inorganic fertiliser containing nitrogen, phosphorus, potassium or magnesium. Where this fails to produce a favourable response, samples of foliage will be collected at the end of the summer and analysed in order to determine the precise problem.
- 5.2.7 A survey will be carried out during the late summer in order to determine the number of dead trees by species in each individual compartment. Planting positions occupied by dead trees will be cleared of vegetation (1,000 mm diameter) in anticipation of new planting. These will be replaced on a 'like for like' basis at the beginning of each new growing season (November).

5.3 Maintenance of natural regeneration bogs, heathland and grassland

5.3.1 While the Nant y Mynydd Conservation area will, like the MWR, be subject to 5 years aftercare the full potential of the newly created peat bogs, the recovery of the heath remnant and the development of wet grassland on previously restored areas as shown on Drawing number **CA12936/005 'Further development of Nant y Mynydd conservation area'** will not be realised within this time frame. It is for this reason that Walter Energy proposes to commit to maintain and actively manage the Conservation area for the duration of the life of the MWR. Proposals for maintenance, management and monitoring would be agreed between the Mineral Planning Authority and Natural Resources Wales but the general arrangements will be as below.

5.3.2 Maintenance of natural regeneration in bogs and on heathland and grassland will be carried out in response to recommendations resulting from survey work carried out by Energybuild Limited's appointed consultant. The expectation is that this will involve the control of rush, willow and bramble together with other plant species considered undesirable to the emergence of the desired NVC or other recorded vegetation communities.

5.3.3 Weed control will be undertaken by herbicide application with care taken to ensure that products used in proximity to the bogs are suitable for use in an aquatic environment. Weed control will be timed to prevent plants maturing thereby reducing the opportunity for seed production and dispersal.

5.3.4 Maintenance of bogs will include the removal of fines from silt traps and this will be undertaken routinely each autumn and spring and as required over the winter months. Inlets and outlets to bogs will be modified as necessary to maintain water conditions at the optimum for the development of favoured vegetation communities and ultimately to promote peat formation.

5.4 Scrub Control on acid grassland and heathland areas

5.4.1 Scrub encroachment is a serious issue facing many acid grassland and heathland sites, especially once the volume of scrub exceeds the threshold of economic viability for implementing effective control programmes. To ensure scrub is carefully managed in the open habitats of the 26.9ha Conservation Grassland annual monitoring is to be carried out, the results from which will inform the necessity for scrub management. Gorse *Ulex europaeus*, Downy Birch and Grey Willow are all potentially troublesome species at the site and thresholds will be set to trigger control responses. It is likely

that annual topping of the vegetation will help prevent the development of scrub across the open ground areas.

6 DRAINAGE PROPOSALS

(Timing, Maintenance Works, Temporary Drainage Methods)

- 6.1 The potential impacts that have been identified during the MWR site filling operations are principally the generation of increased sediment loads in the surface water run-off and an increased rate of surface water run-off from the excavated surfaces. Without mitigation, both of these potential impacts could be of some significance in the short and medium term with temporary moderate adverse effects.
- 6.2 The peripheral intercept channel around the MWR site will temporarily reduce the catchment areas drained to the receiving watercourses and this will have some impact on the flows through the Nant Clwyd waterfall. The catchment area will reduce from an estimated 10.686 Ha to 9.129 Ha, with a corresponding flow reduction of around 15% for any given rainfall event, so 85% of the pre-development flows will continue through the waterfall and this will have only minor impact at this location.
- 6.3 A maximum attenuation volume of up to around 14,000cum will be required for 100-yr rainfall events including climate change, and the provision of the total volume will be split with attenuation volumes of 7,330cum at the southern low point, around 3,570cum at WTA 2A and 3,330cum at WTA 2B. The general arrangement of the operational surface water management system for the site is shown on *Figure 9.15 'Mine Waste Repository SW Management Plan'*.
- 6.4 The maximum discharge from existing Outlet 1 at WTA 2A will be set at 470 l/sec and from existing Outlet 2 at WTA 2B it will be set at 406 l/sec; both are the same discharge rates that are specified by the current environmental permit. The existing attenuation pond at WTA 2A will be reconfigured and extended to provide additional storage volume, the existing attenuation pond at WTA 2B will be enlarged and a third attenuation pond at the southern low point will be added to enable the peak flows to be regulated. The layout details are shown on
- *Figure 9.16, 'Mine Waste Repository WTA 2A Layout'*
 - *Figure 9.17, 'Mine Waste Repository WTA 2B Layout' and*
 - *Figure 9.18, 'Mine Waste Repository Attenuation Pond'.*
- 6.5 The attenuated flows will pass through the parallel settlement lagoons at WTA 2A and WTA 2B to remove sediment and other suspended solids collected by the surface water in transition prior to discharge back into the receiving watercourses. After

passing through the proposed drainage systems the adverse impacts on downstream water quality are considered to be minor to negligible.

- 6.6 The three attenuation areas will be subject to detailed design and although the respective discharges will not be varied from the permitted rates, the added facilities may require a variation of the existing environmental permit from National Resources Wales. If this is required, an application will be submitted at the appropriate time to ensure that the surface water treatment area may be upgraded with additional attenuation volume in good time and as required for the site operations.
- 6.7 The MWR and haul road operational surface water management and surface water treatment systems will remain in place for the duration of the restoration works and will be maintained as long as they are needed to continue to offer protection to the receiving downstream watercourses. The possible impacts associated with sediment on the downstream watercourses during this phase are considered to be at worst minor adverse and would be short-term resulting in temporary effects to surface water quality.

MWR Drainage

- 6.8 The final landform has been designed to replicate the original split of the on-site catchment areas to the east and west so that there will be no long-term changes to the catchment areas and no residual impacts arising from the distribution of the areas that drain to the receiving watercourses.
- 6.9 As the outer flanks of the MWR are constructed there will be the development of a system of permanent peripheral drains which are designed to intercept surface drainage arising from the finished surfaces of the structure. The ditches will be designed to link in with the existing and proposed water treatment facilities as indicated in the ***Proposed Landscaping Scheme, Drawing No. CA12936/007***.
- 6.10 On the MWR structure the proposed restoration drainage system has been designed to re-establish the original watershed between the Rheola Brook and Nant Clwyd which existed prior to the opencast operations affecting the system.
- 6.11 The drainage berms will be arranged at approximately 10 metres vertical intervals down the MWR and have a width of approximately 4.5 metres which is graded back towards a drainage ditch at a gradient of approximately 1 in 10. The drainage ditches will have gradients of between approximately 1.5% and 2.5% and will be linked into the peripheral drainage system.

- 6.12 The potential impacts associated with oil, fuel and hydraulic fluid leakages on the surface water environment will continue to be managed through established good site practice and the potential impacts will be similar to the earlier phases. The on-site arrangements will continue to mitigate against the potential effects from such leakages and these will be maintained during the progressive removal of the other site facilities as they become redundant.
- 6.13 The potential risks from flooding within the site will be minimal and similar to that for the earlier phases. Once the restored ground surfaces have mature vegetation the surface water run-off will return closely to the original baseline conditions to allow the attenuation ponds to be partially reshaped and/or filled with on-site material. The restoration works to the surface water management systems will be undertaken as the final operations before each part of the site enters into aftercare arrangements.

Provision of ponds

- 6.14 A number of small, shallow, ponds are to be created within the MWR Conservation Area boundary, as indicated on Drawings CA12936-006, 007 and 008. These ponds are primarily intended to provide breeding habitat for amphibians, in part to help support the local population of Honey Buzzards *Pernis apivorus*. They will however, also provide excellent habitat for other vertebrates such as Otter *Lutra lutra*, Water Vole *Arvicola terrestris*, Grey Heron *Ardea cinerea* plus a wealth of aquatic invertebrates. The ponds will also support the conservation of a number of localised plant species, such as Floating Bur-reed *Sparganium angustifolium* and Round-leaved Crowfoot *Ranunculus omiophyllus*.

8 ANNUAL AFTERCARE PROGRAMMES

- 8.1 The Mineral Planning Authority, Natural Resources Wales and Walter Energy will carry out an inspection of the site during the late spring in any year. Prior to this visit, a written annual report will be presented describing the aftercare operations carried out in the preceding year, reporting on the results of monitoring in the same period and outlining restoration proposals for the forthcoming year.
- 8.2 The reports will be expected to contain information on the following:
- statement explaining soil use and management in the preceding 12 months reconciling original estimated resources to actual quantities recovered for the areas disturbed and the quantities reinstated to confirm the available resources remain sufficient to deliver the approved restoration scheme;
 - the severity and extent of damage to the drainage systems over the winter period, including details of remedial measures;
 - measures taken to deal with resurgent water i.e. springs;
 - the survival of trees and details on the replacement of failures;
 - the extent of animal browsing and measures for containing damage;
 - application of contact and residual herbicide application needed to contain weed growth;
 - foliar analysis carried out to determine nutritional deficiencies / disorders;
 - chemical analysis to investigate causes of establishment failure;
 - reseeding areas of poor take; and
 - changes in soil reaction and species composition on dry neutral grassland.
- 8.3 The aftercare scheme will include an update on the development of vegetation communities and habitat creation within the Nant y Mynydd Conservation Area with confirmation of maintenance undertaken in the preceding months and ongoing management.

APPENDICES

APPENDIX 1

SOIL USE AND MANAGEMENT FOR THE RESTORATION OF THE MINE WASTE REPOSITORY

Proposed Mine Waste Repository, Nant Y Mynydd, Neath, Port Talbot - Potential soil resources and their allocation for site restoration

Table 4. Soil use and management for the restoration of the Mine Waste Repository (Revised 13th May 2014)

Part 1. Soil resources available for use in restoration

Source	Estimated volume of soil resources available (m³)					Total (m³)
	Peat / subsoil composite	Deep peat	Clay	Soil-forming material (rock regolith and subsoil)	Soil-forming material (colliery discard)	
Soil resources from previous opencast developments and ongoing drift mining	284,045	0	800	30,813	0	315,658
Soil resources from Additional previously undisturbed areas that will be restored	149,247	53,283	7,113			209,643
Total	433,292	53,283	7,913	30,813	0	525,301

Part 2. Restored soil profiles and allocation of soils by vegetation type

Vegetation type	Area (ha)	Instruction of restored soil profiles, thickness of soil layers (mm) and position					Soil volume required (m³)					Total (m³)
		Peat / subsoil composite	Deep peat	Clay	Soil-forming material (rock regolith and subsoil)	Soil-forming material (colliery discard)	Peat / subsoil composite	Deep peat	Clay	Soil-forming material (rock regolith and subsoil)	Soil-forming material (colliery discard)	
		Upper layer	Upper layer	Lower layer	Lower layer	Lower layer						
Mine Waste Repository												
Peat bog 5	1.2	0	1,800	500	0	0	0	21,600	6,000	0	0	27,600
Commercial forestry plantation - Sitka spruce	28.4	900	0	0	0	0	255,600	0	0	0	0	255,600
Commercial forestry plantation - Sitka spruce	2.0	0	450	0	450	0	0	9,000	0	9,000	0	18,000
Amenity woodland - Open Scots pine with minor downy birch and rowan	8.9	900	0	0	0	0	80,100	0	0	0	0	80,100
Conservation grassland - mosaic of wet and dry acidic grassland with	26.9	325	0	0	75	0	87,295	0	0	20,145	0	107,440
Grassland along berms, within fire breaks and road verges	6.6	150	0	0	0	0	9,900	0	0	0	0	9,900
Sub total	74.0						432,895	30,600	6,000	29,145	0	498,640
Nant y Mynydd - Conservation area												
Peat bog 1	0.55	0	2,235	0	0	0	0	12,293	0	0	0	12,293
Satellite Peat bog 1	0.16	0	1,155	250	0	0	0	1,802	390	0	0	2,192
Extension Peat bog 2	0.45	0	1,745	250	0	0	0	7,887	1,130	0	0	9,017
Total allocated							432,895	52,582	7,520	29,145	0	522,142
Total available							433,292	53,283	7,913	30,813	0	525,301
Balance							397	701	393	1,668	0	3,159

APPENDIX 2

SOIL VOLUME GENERATION BY INDIVIDUAL PHASES

Proposed Mine Waste Repository, Nant Y Mynydd, Neath, Port Talbot - Potential soil resources and their allocation for site restoration

Table 5. Soil volume generation by individual phases (Revised 13th May 2014)

Phase	Location	Area (ha)	Extent of soil cover to be removed to allow deposition of colliery discard (ha)			Estimate of soil volume to be recovered prior to deposition of colliery discard (m ³)			Total soils to be excavated (m ³)	Volume of peat and clay to be deposited within Nant Y Mynydd Conservation	Soils retained within Mine Waste Repository for use in restoration (m ³)
			Natural soils on undisturbed area	Reinstated soils on previously restored area	Long-term soil storage	Natural soils on undisturbed area	Reinstated soils on previously restored area	Long-term soil storage			
1	Open final void from FQ2E and temporary spoil holding area / delivery pad	10.90	1.78	0.00	0.00	29,077	0	0	29,077	13,323	15,754
2	Opencast backfill (graded)	11.20	0.40	0.00	0.60	4,744	0	9,814	14,558	1914	12,644
3	Overburden mound 1 (ungraded)	3.80	0.00	0.00	0.00	0	0	0	0	0	0
4	Undisturbed ground (Additional land to the south of FQ2E)	8.40	8.22	0.00	0.00	58,646	0	0	58,646	0	58,646
5	Overburden mound 2 with soil storage over, including restored area	19.00	0.00	3.70	10.40	0	33,485	163,560	197,045	0	197,045
6	Restored ground within the former Forest Quarry OCCS	12.00	0.00	11.60	0.00	0	87,000	0	87,000	0	87,000
7	Undisturbed ground (Additional land to the east of FQ2E)	11.40	10.78	0.00	0.00	117,175	0	0	117,175	8,175	109,000
Total		76.70	21.18	15.30	11.00	209,643	120,485	173,374	503,502	23,412	480,090

Note:

Excavation arising from Nant Y Mynydd (circa 20,999 m³) generated in the course of excavating Bog 2 Extension and Satellite Peat bog 1 are excluded from the above calculations

Soils used to establish grassland along berms, within fire breaks and along verges which account for less than 2% of the soils utilised in the restoration scheme are ignored for the purpose of the above

APPENDIX 3

SOIL VOLUME UTILISED IN PROGRESSIVE RESTORATION

Proposed Mine Waste Repository, Nant y Mynydd, Neath Port Talbot – Restoration and Aftercare Scheme

Table 6: Soil volume utilised in progressive restoration (Revised 5th March 2024)

Phase	Location	Area (ha)	Soils retained within Mine Waste Repository for use	Vegetation type (Ha)				Soil used in soil profile construction (m3)			Soil Volume used in soil profile construction (m3)	Running total of soil utilised in restoration (m3)	Notes
				Commercial Forestry plantation – Sitka spruce	Amenity woodland – Open Scots pine with minor downy birch and rowan	Conservation grassland – mosaic of wet and dry acidic grassland	Peat Bog	Soil Profile 2	Soil Profile 1	Soil Profile 3			
Soil profile thickness (mm)								900	400	2,300			
2	Opencast backfill (graded)	11.20	12,644	6.30	2.50	0.80	0.00	79,200	3,200	0	82,400	12,644	Excess into temporary storage
4	Undisturbed ground (Additional land to the south of FQ2E)	8.40	58,646	7.00	0.00	0.00	0.00	63,000	0	0	63,000	-23,754	Shortfall from temporary storage
5	Overburden mound 2 with soil storage over, including restored area	19.00	197,045	10.800	3.20	1.90	0.00	126,000	7,600	0	133,600	134,045	Rehandling of stored soils required
6	Restored ground within the former Forest Quarry OCCS	12.00	87,000	0.000	1.60	7.80	1.20	14,400	31,200	27,600	73,200	-46,600	Shortfall from temporary storage
7	Undisturbed ground (Additional land to the east of FQ2E)	11.40	109,000	6.000	1.50	3.00	0.00	67,500	12,000	0	79,500	35,800	Excess into temporary storage
1	Open final void from FQ2E and temporary spoil holding area/delivery pad	10.90	15,754	0.0027600	0.00	10.40	0.00	0	41,600	0	41,600	-63,746	Shortfall from temporary storage
3	Overburden mound 1 (ungraded)	3.80	0	0.50	0.10	3.00	0.00	5,400	12,000	0	17,400	-41,600	Shortfall from temporary storage
Total		76.70	480.090	30.60	8.90	26.90	1.20	355,500	107,600	27,600	490,700		

Note:

1. The differences between the area of each vegetation unit contained within the restoration scheme and those shown on the table are because the surface areas shown on the drawing have been calculated in LSS which takes into account the topography whereas the areas calculated on the table are flat surface areas. Soil quantities have been adjusted to take account of the error.
2. Soils used to establish grassland along berms, within fire breaks and along verges which account for less than 2% of the soils utilised in the restoration scheme are ignored for the purpose of the above.
3. Soils used in progressive restoration are ignored for the purpose of the above calculation and it is assumed that all areas within a phase will be available for restoration which is unlikely to be the case for earlier phases in particular
4. Clay and peat (circa 23,502m3) utilised in the course of constructing Peat Bog 1, Bog 2 Extension and Satellite Peat bog 1 are excluded from the above calculations.

APPENDIX 4

SEED MIX FOR CONSERVATION GRASSLAND – MOSAIC OF WET AND DRY ACIDIC GRASSLAND

Proposed Mine Waste Repository, Nant y Mynydd, Neath Port Talbot – restoration and aftercare scheme

Table 7: Seed mix for conservation grassland – mosaic of wet and dry acidic grassland (Revised 1st March 2024)

Name		Numbers		Open ground reference number and area (m ²)		Total (kgs.)
Common	Scientific	Composition (% by weight)	Kilograms of seed (per Ha)	G-01	G-02	
Slender creeping red fescue	<i>Festuca rubra</i> spp. <i>litoralis</i>	35	21	389	179	583
Creeping bent	<i>Agrostis stolonifera</i>	30	18	333	151	500
Crested dogs tail	<i>Cynosurus cristatus</i>	8	4.8	89	40	133
Meadow fescue	<i>Festuca pratensis</i>	5	3	55	25	83
Cocksfoot	<i>Dactylis glomerata</i>	5	3	55	25	83
Velvet bent	<i>Agrostis canina</i> spp. <i>Canina</i>	5	3	55	25	83
Annual meadow grass	<i>Poa annua</i>	5	3	55	25	83
Rough stalked meadow grass	<i>Poa compressa</i>	5	3	55	25	83
Wild white clover	<i>Trifolium repens</i>	2	1.2	22	10	33
Total		100	60	1108	505	1664

Note:

Underlying colliery fill to be completely cultivated to 750mm below ground level prior to soil placement over at strategic locations

APPENDIX 5

FORESTRY AND WOODLAND PLANTING MIXES

Proposed Mine Waste Repository, Nant y Mynydd, Neath Port Talbot – Restoration and Aftercare Scheme

Table 8: Forestry and woodland planting mixes (Revised 5th March 2024)

Part 1a Commercial Forestry Plantation – Sitka Spruce

Name		Numbers				Sub-compartment reference and area (ha)										Total (No.)
Common	Scientific	%	Spacing (between rows) (Metres)	Spacing (within rows) (Metres)	Plants (per Ha)	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10	
Gross Area						0.35	1.99	1.79	0.11	4.14	3.53	4.29	2.68	2.28	1.64	22.81
Allowance for open space						0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net plantable area (ha)					3,086	0.35	1.99	1.79	0.11	4.14	3.53	4.29	2.68	2.28	1.64	22.81
Sitka Spruce	Picea sitchensis	99	1.8	1.8	3,056	1,071	6094	5482	337	12640	10793	13099	8198	6973	5003	69690
Rowan	Sorbus aucuparia	1	1.8	1.8	30	10	62	56	4	128	110	132	82	70	50	704
Total		100			3,086	1,082	6,155	5,537	340	12,768	10,902	13,231	8,281	7,043	5,054	70,394

Part 1b: Commercial Forestry Plantation – Sitka Spruce

Name		Numbers				Sub-compartment reference and area (ha)										Total (No.)
Common	Scientific	%	Spacing (between rows) (Metres)	Spacing (within rows) (Metres)	Plants (per Ha)	SS-11	SS-12	SS-13	SS-14							
Gross Area						1.51	1.30	1.95	1.35							6.10
Allowance for open space						0.00	0.00	0.00	0.00							0.00
Net plantable area (ha)					3,086	1.51	1.30	1.95	1.35							6.10
Sitka Spruce	Picea sitchensis	99	1.8	1.8	3,024	4,565	3,925	5,886	4,070							18,446
Rowan	Sorbus aucuparia	1	1.8	1.8	62	94	80	120	84							378
Total		100			3,086	4,659	4,005	6,006	4,154							18,824

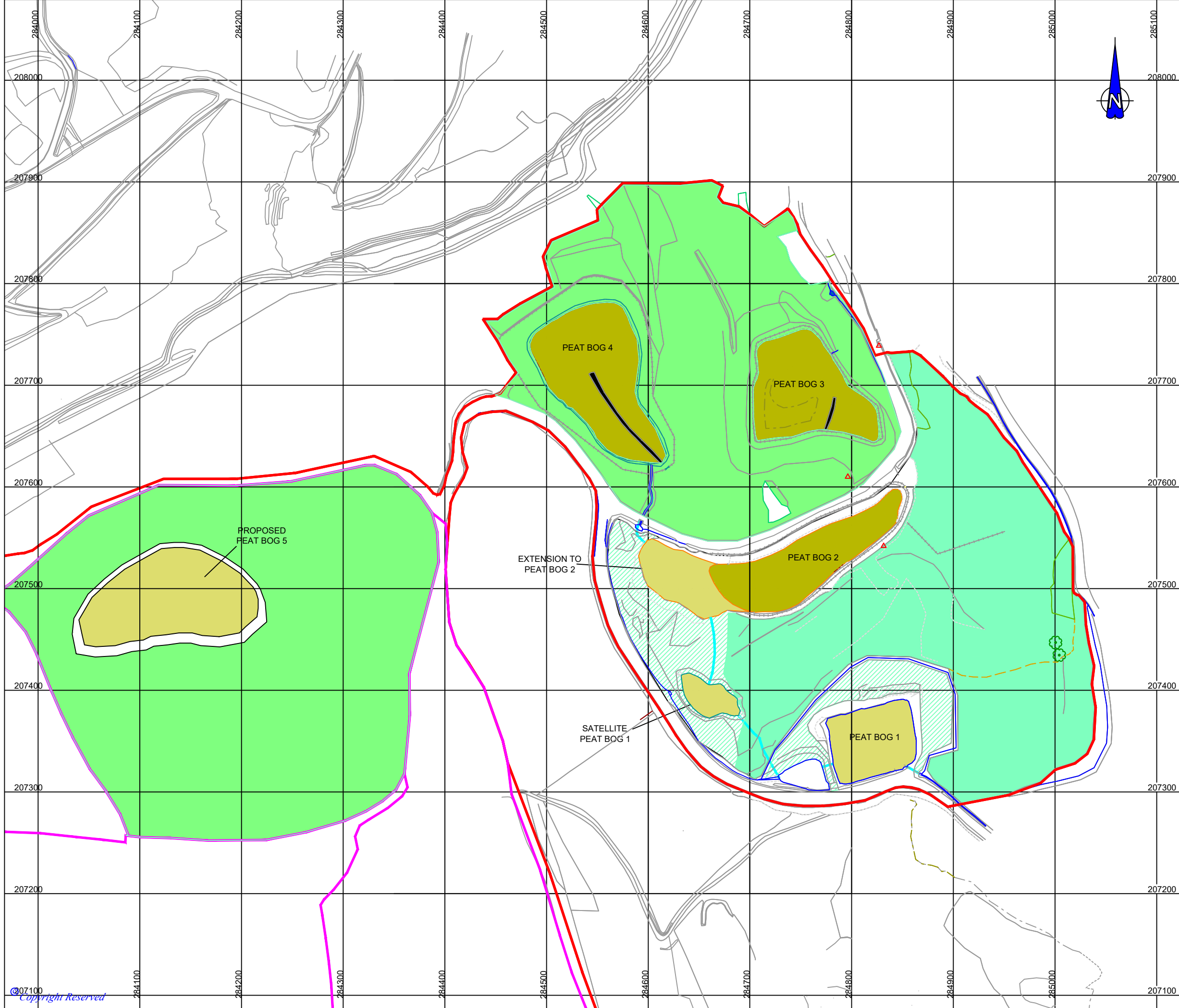
Part 2: Amenity Woodland – Open Scot’s Pine with minor downy birch and rowan

Name		Numbers				Sub-compartment reference and area (ha)										Total (No.)
Common	Scientific	%	Spacing (between rows) (Metres)	Spacing (within rows) (Metres)	Plants (per Ha)	SP-01	SP-02	SP-03	SP-04	SP-05						
Gross Area						0.98	2.13	2.42	2.61	0.75						8.89
Allowance for open space						0.20	0.43	0.48	0.52	0.15						1.78
Net plantable area (ha)					3,086	0.78	1.70	1.93	2.09	0.60						7.11
Scots pine	Pinus sylvestris	90	1.8	1.8	2,777	2,171	4,725	5,366	5,807	1,674						19,743
Downy birch	Betula pubescens	5	1.8	1.8	154	120	263	299	323	93						1,098
Rowan	Sorbus aucuparia	5	1.8	1.8	154	120	263	299	323	93						1,098
Total					3,085	2,411	5,251	5,964	6,453	1,860						21,939

DRAWINGS

DRAWING CA12936/005

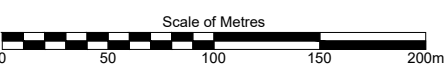
Further development of Nant y Mynydd Conservation Area



DO NOT SCALE FROM THIS DRAWING

- Legend
- Mine Waste Repository and Nant y Mynydd Conservation Area Planning Application Boundary
 - Existing Peat Bogs (Constructed as part of the mitigation scheme for the Forest Quarry 2 Extension OCCS.)
 - Proposed Peat Bogs (To be constructed as part of the mitigation scheme for the Mine Waste Repository)
 - Conservation Grassland - mosaic of wet and dry acidic grassland with scattered hawthorn
 - Recovering Heathland on ground only marginally affected by previous development
 - Area effected by previous development with subsoil/soil forming material exposed on ground surface
 - Drainage channel

DESCRIPTION	PEAT SURFACE AREA (m²)	PEAT VOLUME (m³)	CLAY LINING VOLUME (m³)	MUCKSHIFT VOLUME (m³)
BOG 1	5,500	12,285	NIL	2,885
BOG 2 EXTENSION	4,520	7,870	1,130	15,520
PEAT BOG 5	12,000	21,600	6,000	0
SATELLITE PEAT BOG 1	1,560	1,805	390	2,594
TOTALS	23,580	43,560	7,520	20,999



REVISION	DETAILS	DATE	DRN	CHKD	APP'D
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CLIENT

PROJECT

MINE WASTE REPOSITORY
P2014/0729 - CONDITIONS 69 & 72
RESTORATION & AFTERCARE SCHEMES

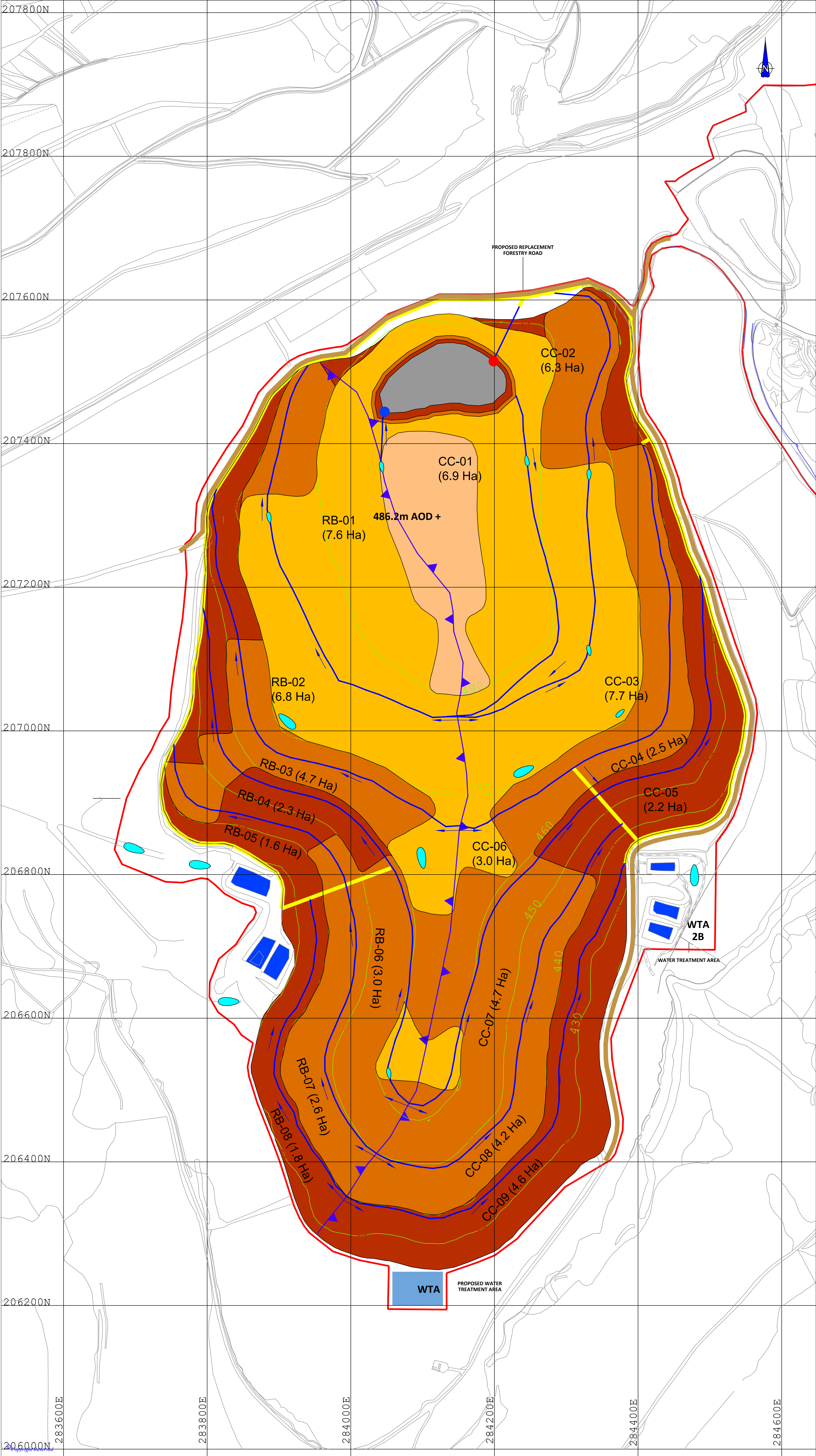
DRAWING TITLE

FURTHER DEVELOPMENT OF
NANT-Y-MYNYDD CONSERVATION AREA

DRG No.	CA12936-XXX	REV	SUIT.
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DRAWN BY	DNH	CHECKED BY	APPROVED BY

DRAWING CA12936/006

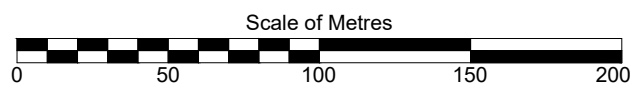
**Proposed final landform, slope gradients, surface water drainage system
and access arrangements**



DO NOT SCALE FROM THIS DRAWING

REFERENCE

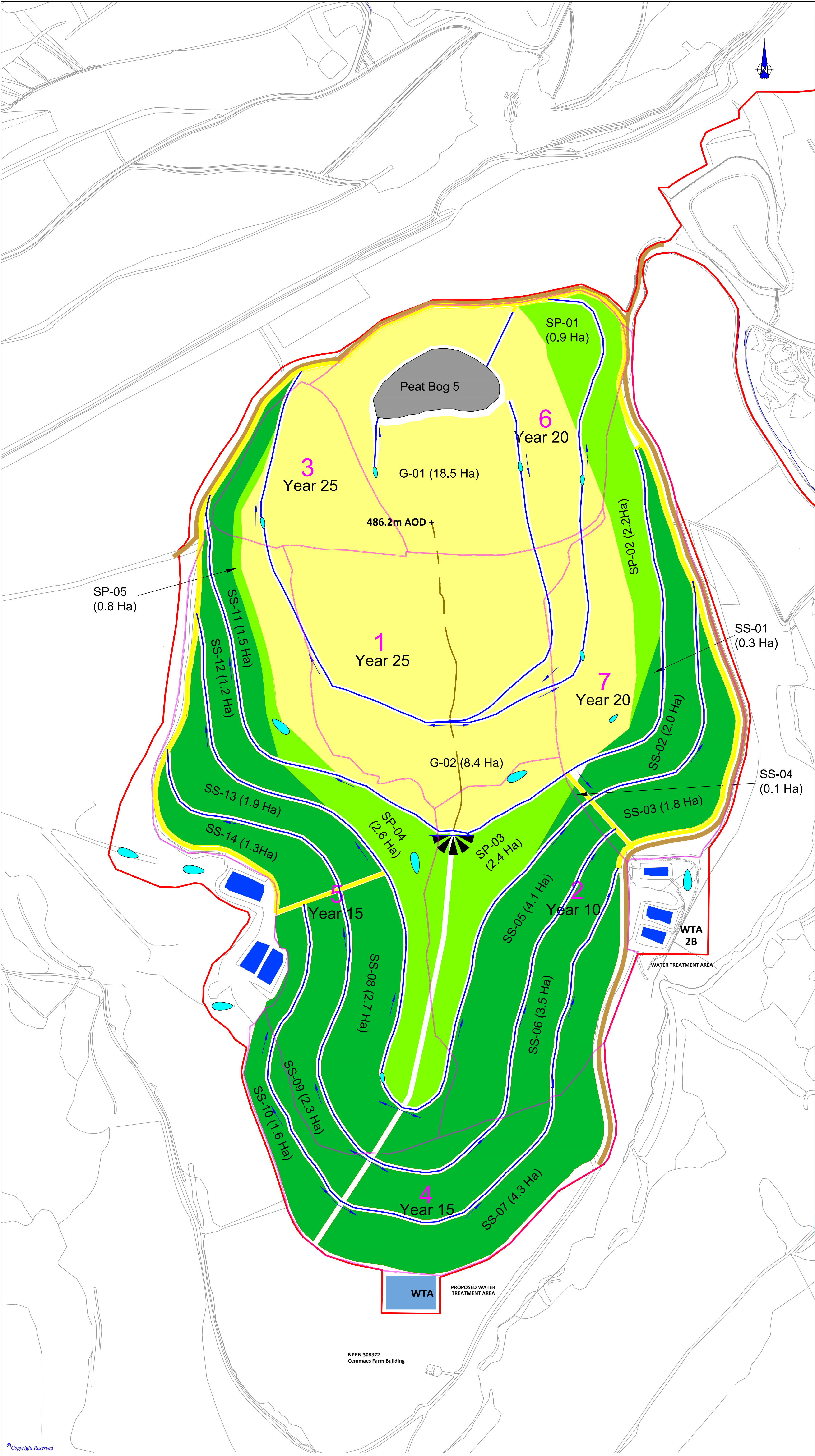
- Mine Waste Repository and Nant y Mynydd Conservation Area boundary
- Proposed alignment of Forestry Roads
- Proposed Peat Bog 5 (12,000 m²)
- Proposed Peat Bog 5 Inlet
- Proposed Peat Bog 5 Outlet
- Water Treatment Area
- Proposed Drainage Berm
- Stone Armoured Channel
- Proposed Drainage Ditch
- Watershed
- Slope Gradients
 - <5%
 - 6-10%
 - 11-20%
 - 21-33%
- Catchments
 - Rheola Brook (31.3 Ha)
 - Craig Clwd (41.9 Ha)
- Shallow Pond (habitat creation)



A		Addition of habitat ponds		2.2x	NH		
REVISION		DETAILS		DATE	ISSUED	CHNG	APPR
CLIENT							
PROJECT		MINE WASTE REPOSITORY P2014/0729 - CONDITIONS 69 & 72 RESTORATION & AFTERCARE SCHEMES					
DRAWING TITLE		PROPOSED FINAL LANDFORM, SLOPE GRADIENTS, SURFACE WATER DRAINAGE SYSTEM AND ACCESS ARRANGEMENTS					
DRG No.		CA12936-006		REV	A	SUIT. CODE	
DRG SIZE		A1		SCALE	1:2500 @A1		DATE
DRAWN BY		DNH		CHECKED BY			APPROVED BY

DRAWING CA12936/007

Proposed landscaping scheme



DO NOT SCALE FROM THIS DRAWING

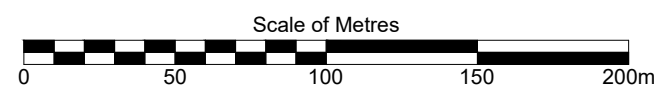
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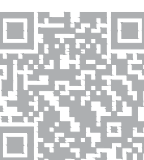
- Mine Waste Repository and Nant y Mynydd Conservation Area Boundary
- Phasing Areas 1-7
- Proposed alignment of Forestry Roads
- Water Treatment Area
- Proposed Drainage Berm
- Stone Armoured Channel
- Proposed Drainage Ditch
- Footpath to Viewing Platform
- Vegetation Type
 - Amenity Woodland - Open Scots Pine with minor downy birch and rowan (8.9 Ha)
 - Commercial Forestry Plantation - Sitka Spruce (30.4 Ha)
 - Conservation Grassland - mosaic of wet and dry acidic grassland (26.9 Ha)
 - Peat bog - bog community by translocation of turfs augments by natural recolonisation (1.2 Ha)
- Circular viewing platform to represent a sheep fold
- Shallow Pond (habitat creation)

Approximate completion of progressive restoration of each Phase

Phase 2	Year 10
Phase 4 & 5	Year 15
Phase 6	Year 20
Phase 7, 1 & 3	Year 25

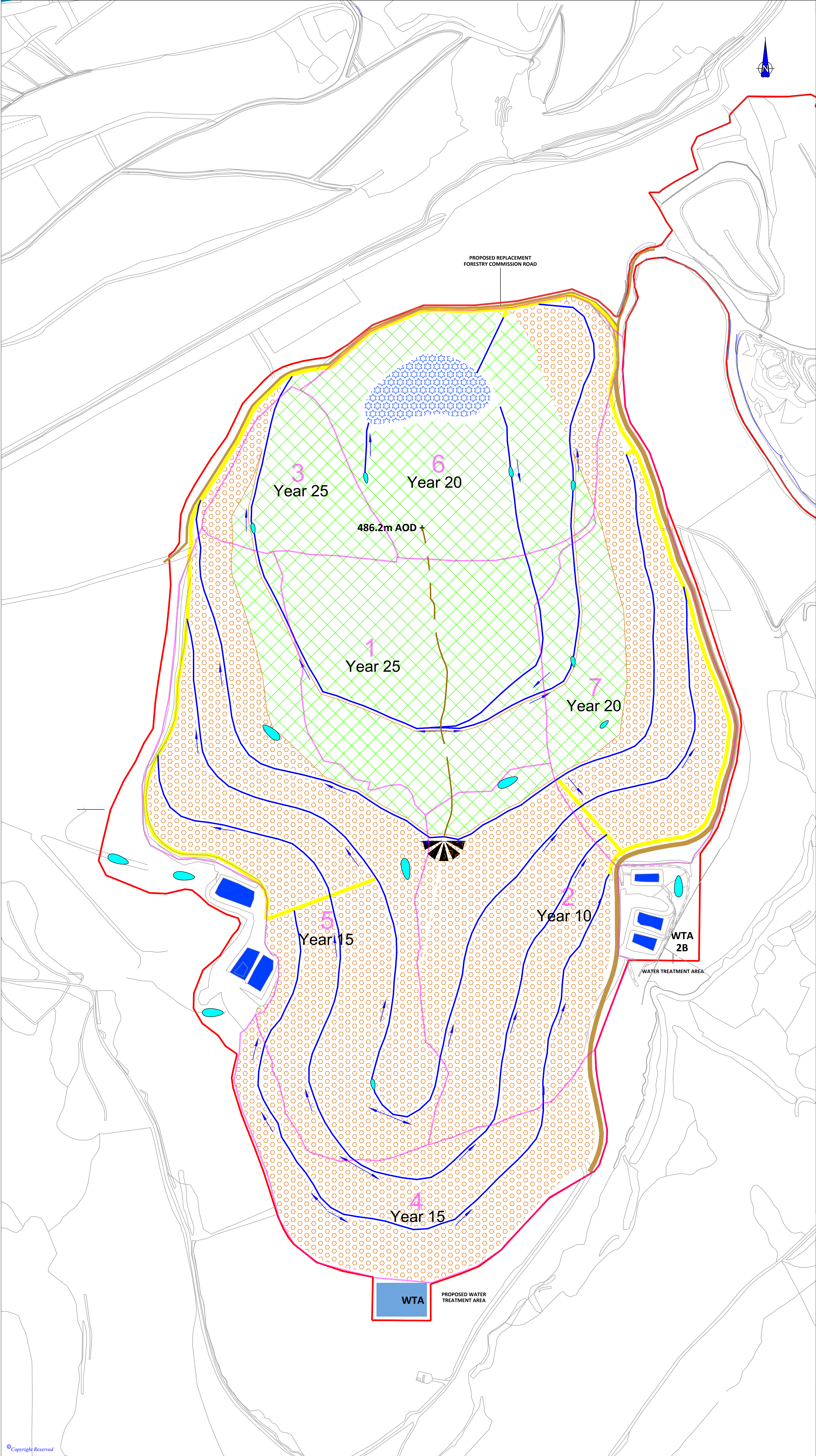
- Note:
- Berms, which will remain un-surfaced, will provide access for all ability groups from the surrounding forest roads into the restored area.
 - Landscape design to be reviewed on a 5 year basis and this is to be synchronized with the Natural Resources Wales review of their Forest Design Plan for the Resolven Block



A		Addition of habitat ponds		1:2.50	NH		
REVISION		DETAILS		DATE	ISSUED	CHNG	APPR
CLIENT							
PROJECT		MINE WASTE REPOSITORY P2014/0729 - CONDITIONS 69 & 72 RESTORATION & AFTERCARE SCHEMES					
DRAWING TITLE		PROPOSED LANDSCAPING SCHEME					
DRG No. CA12936-007a				REV A		SUIT. CODE	
DRG SIZE A1		SCALE 1:2500 @A1		DATE OCTOBER 2023			
DRAWN BY DNH		CHECKED BY		APPROVED BY			
							

DRAWING CA12936/008

Proposed restored soil profiles



DO NOT SCALE FROM THIS DRAWING

REFERENCE

Mine Waste Repository and Nant y Myydd Conservation Area Boundary

Proposed alignment of Forestry Roads

Water Treatment Area

Proposed Drainage Berm

Stone Armoured Channel

Proposed Drainage Ditch

Footpath

Soil Profiles

Soil Profile 1. - 400mm Peat/ Subsoil Mix (Conservation Grassland) (26.9 Ha)

Soil Profile 2. - 900mm Peat/Subsoil composite (Commercial Forestry plantation and Amenity Woodland) (39.8 Ha)

Soil Profile 3. - 1,800mm pristine deep peat (Peat Bog) (1.2 Ha)

Natural Dry Stone Wall Viewing Platform

Phasing Areas 1-7

Shallow Pond (habitat creation)

Approximate completion of progressive restoration of each Phase

Phase 2

Phase 4 & 5

Phase 6

Phase 7, 1 & 3

Year 10

Year 15

Year 20

Year 25

Note:
Soiling of cut and fill faces above and below berms, and along the verges to forest roads is not identified. These will receive 100 mm peat / subsoil composite with the colliery discard scarified before soil placement.

Soil disturbed within the Advanced Works Area within the Additional land to the west of the Forest Quarry 2 Extension OCCS will be retained within, and reserved for, local reinstatement.

Scale of Metres

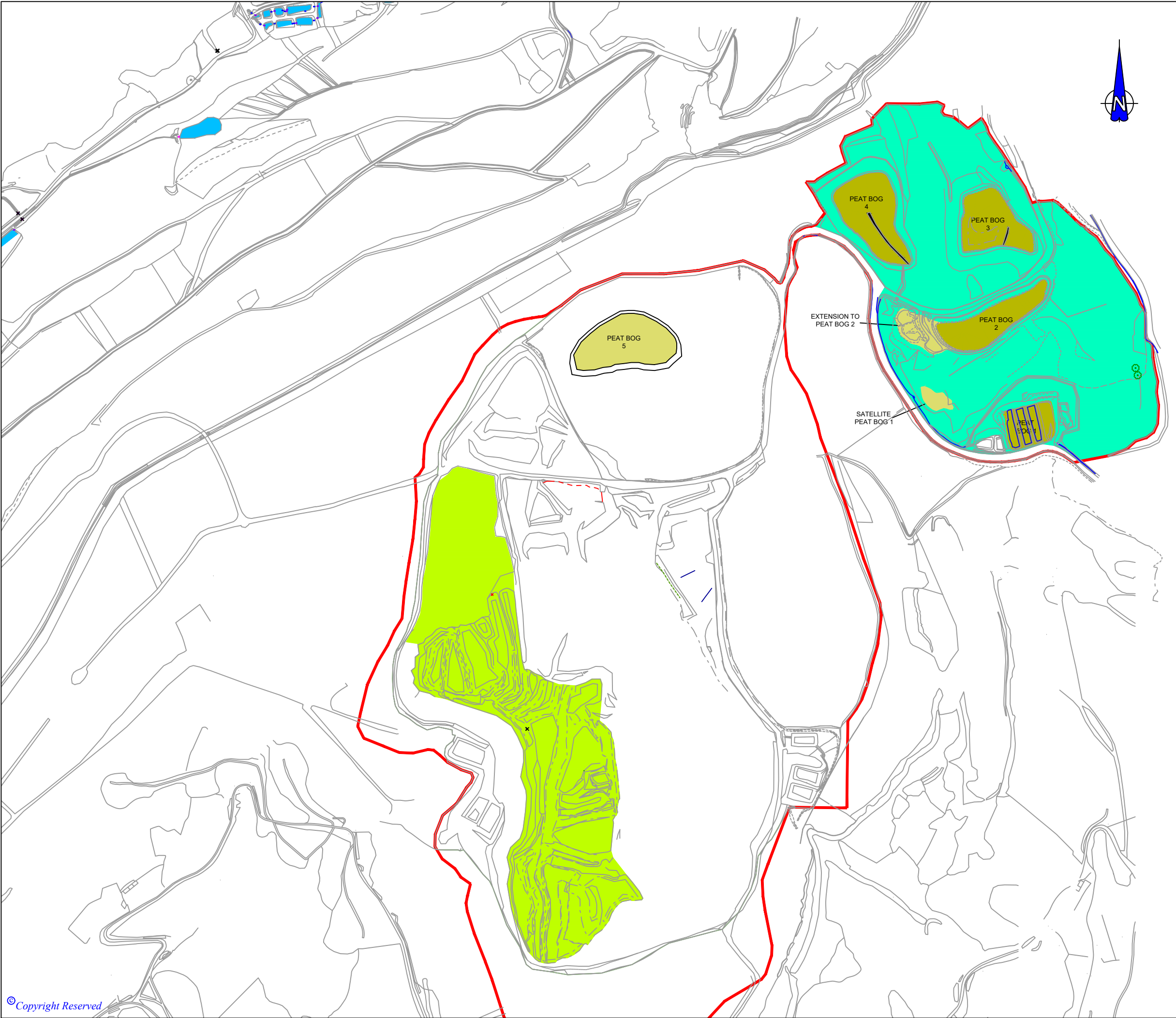
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A	Addition of habitat ponds	2.2.20	NH		
REVISION	DETAILS	DATE	ISSUED	CHNG	APPR
CLIENT	Energybuild				
PROJECT	MINE WASTE REPOSITORY P2014/0729 - CONDITIONS 69 & 72 RESTORATION & AFTERCARE SCHEMES				
DRAWING TITLE	PROPOSED RESTORED SOIL PROFILES				
DRG No.	CA12936-008	REV	A	SUIT. CODE	
DRG SIZE	A1	SCALE	1:2500 @A1	DATE	OCTOBER 2023
DRAWN BY	DNH	CHECKED BY		APPROVED BY	

wardell armstrong

DRAWING CA12936/009

Proposals for ecological conservation in the course of operating the Mine Waste Repository



DO NOT SCALE FROM THIS DRAWING

- Legend
- Mine Waste Repository and
Nant y Mynydd Conservation Area
Boundary _____
- Conservation Area 1 - for Ground
Nesting Birds (13.5 Ha) _____
- Conservation Area 2 - Wetland, Bog and
Heath Habitat (21.3 Ha) _____
- Proposed Additional Peat Deposition
Requirement (2.35 Ha) _____

Note:

Conservation Area 1 to be reduced in the course of
the development by the removal of stored soils for use
in progressive restoration.

Conservation Area 2 to be augmented by the creation
for four additional bogs using peat removed from
additional land to the east of the former Forest Quarry
2 Extension OCCS prior to overtipping by colliery
discard.



REVISION	DETAILS	DATE	DRN	CHKD	APP'D

CLIENT


Energybuild

PROJECT

MINE WASTE REPOSITORY
P2014/0729 - CONDITIONS 69 & 72
RESTORATION & AFTERCARE SCHEMES

DRAWING TITLE

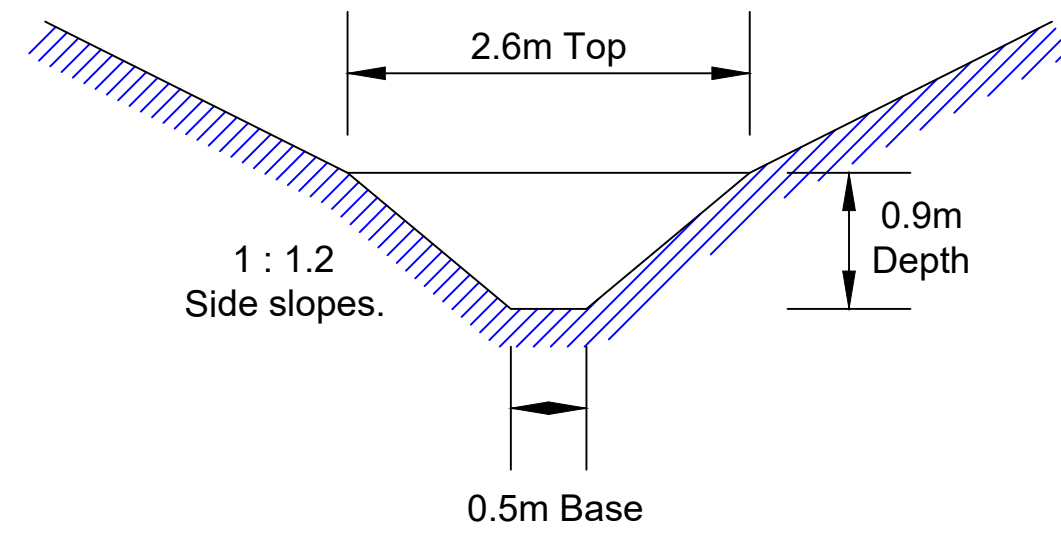
PROPOSALS FOR ECOLOGICAL
CONSERVATION DURING OPERATION
OF THE MINE WASTE REPOSTORY

DRG No.	CA12936-009	REV	SUIT.
DRG SIZE	A3	SCALE	1:2500 @ A3
DRAWN BY	DNH	CHECKED BY	APPROVED BY
DATE	OCTOBER 2023		

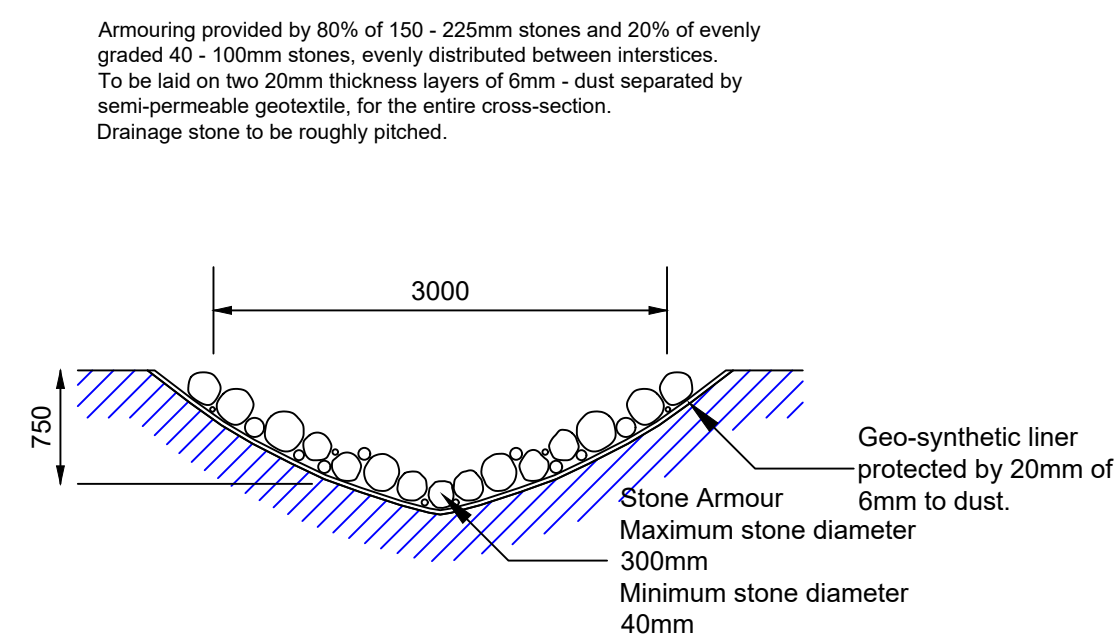


DRAWING CA12936/010

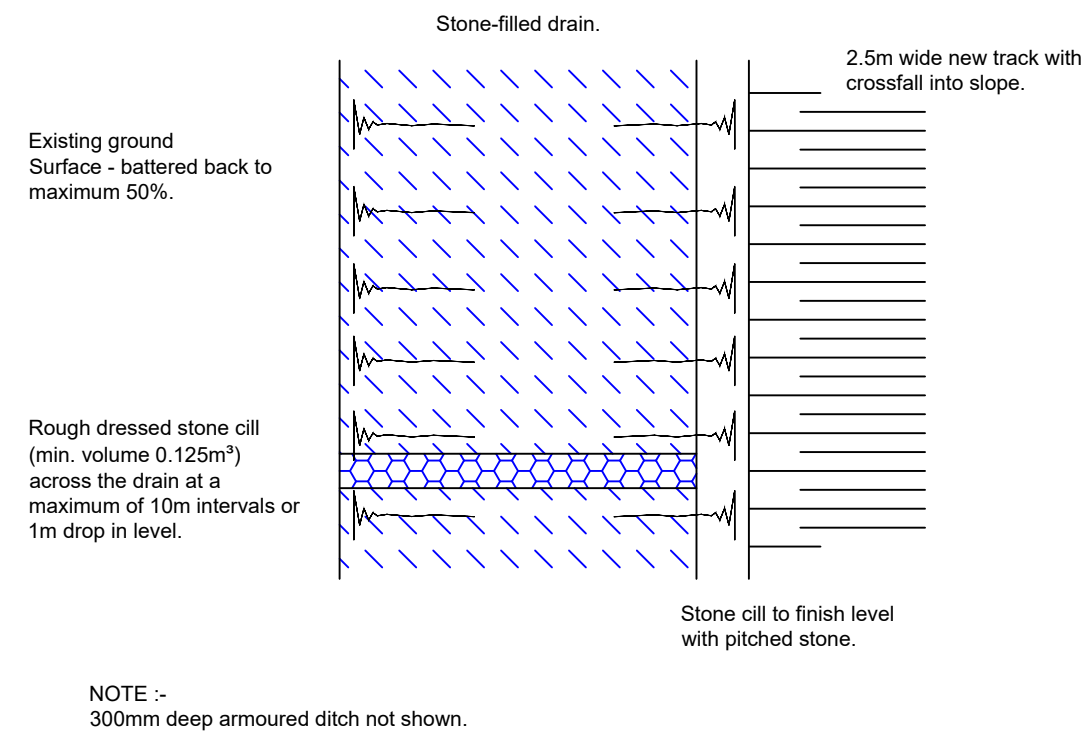
Standard details for permanent infrastructure



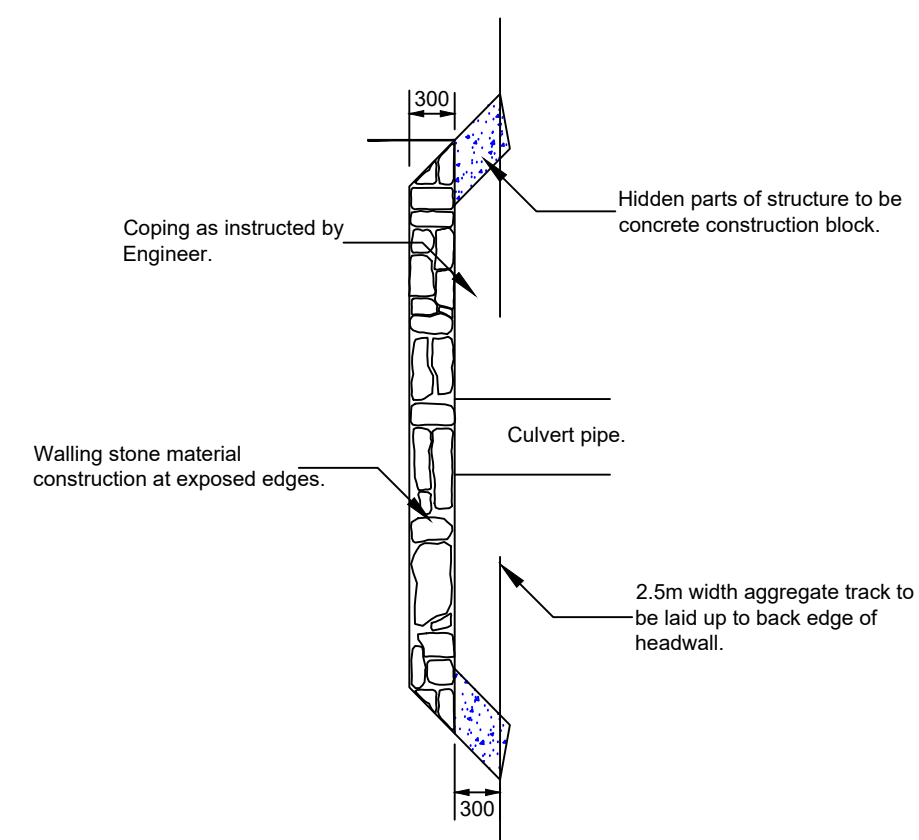
TRAPEZOIDAL DITCH
CROSS-SECTION



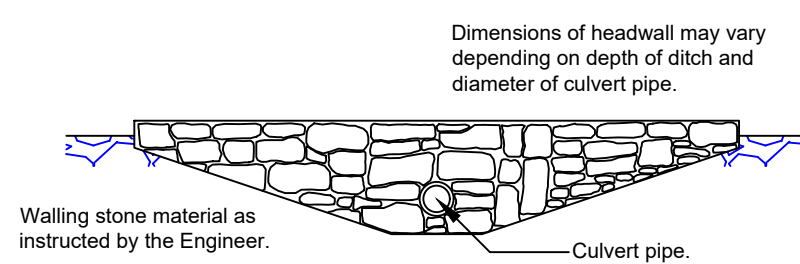
ARMOURED CHANNEL DETAIL - SECTION



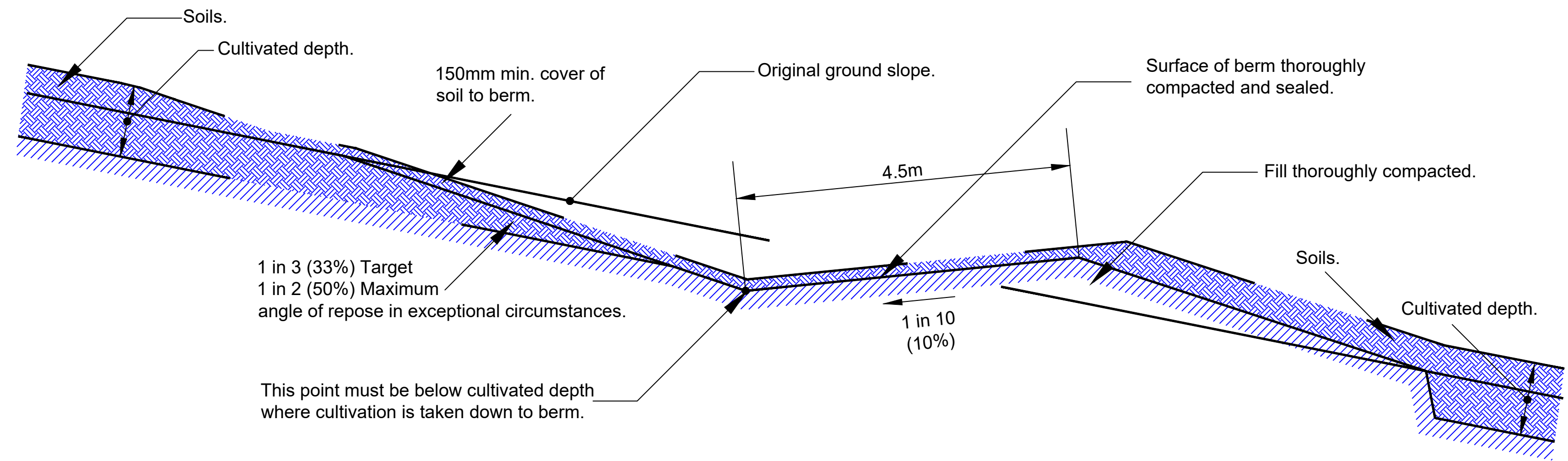
STONE ARMOURED CHANNEL DETAIL - PLAN



DRYWALL RANDOM WALLING
HEADWALL DETAIL (Plan)



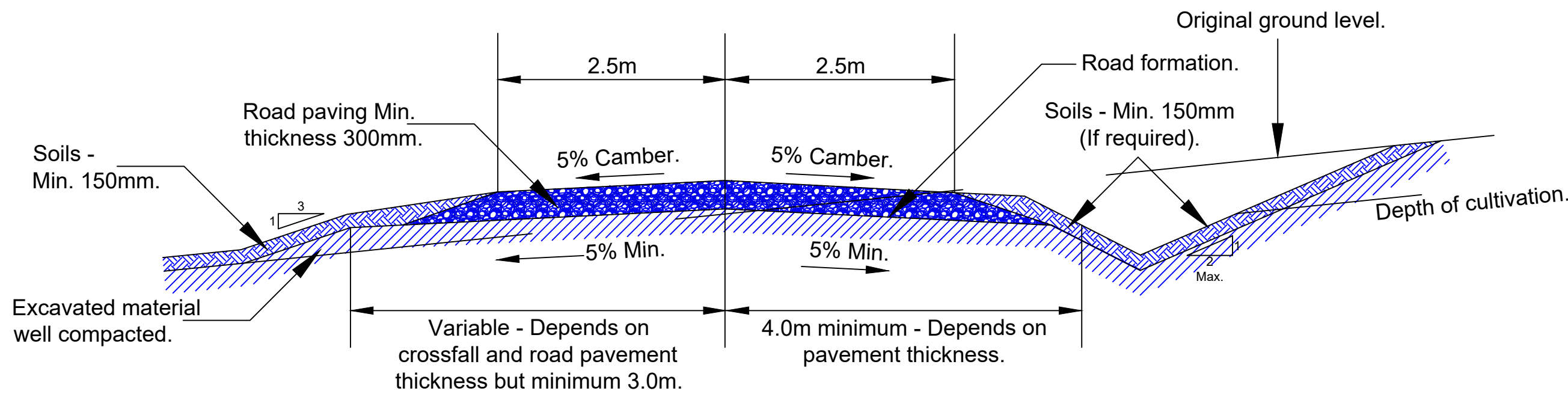
DRYWALL RANDOM WALLING
TYPICAL HEADWALL DETAIL



CONSTRUCTION OF BERM (1 in 5 SIDESLOPE SHOWN)

NOTES :-

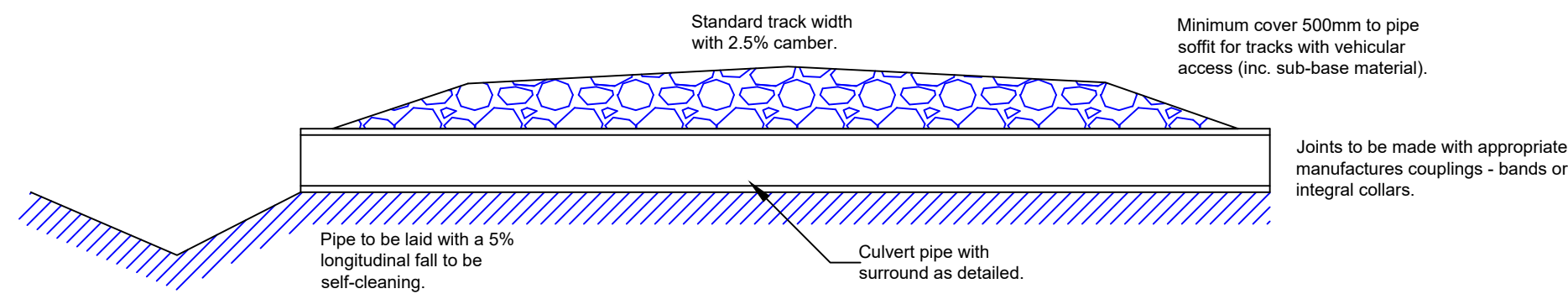
- Longitudinal gradient to be between 1.5% and 2.5%. Once gradient of a particular berm is chosen there shall be no increasing or slackening of gradients which could lead to scour and/or silting of the berm.
- Where berms connect with carrier drains the final 10 metres of the berm shall be armoured with durable stone 300mm nominal size to prevent scour at the junction of the berm and carrier drain which may involve steepening of the berm gradient over this length.



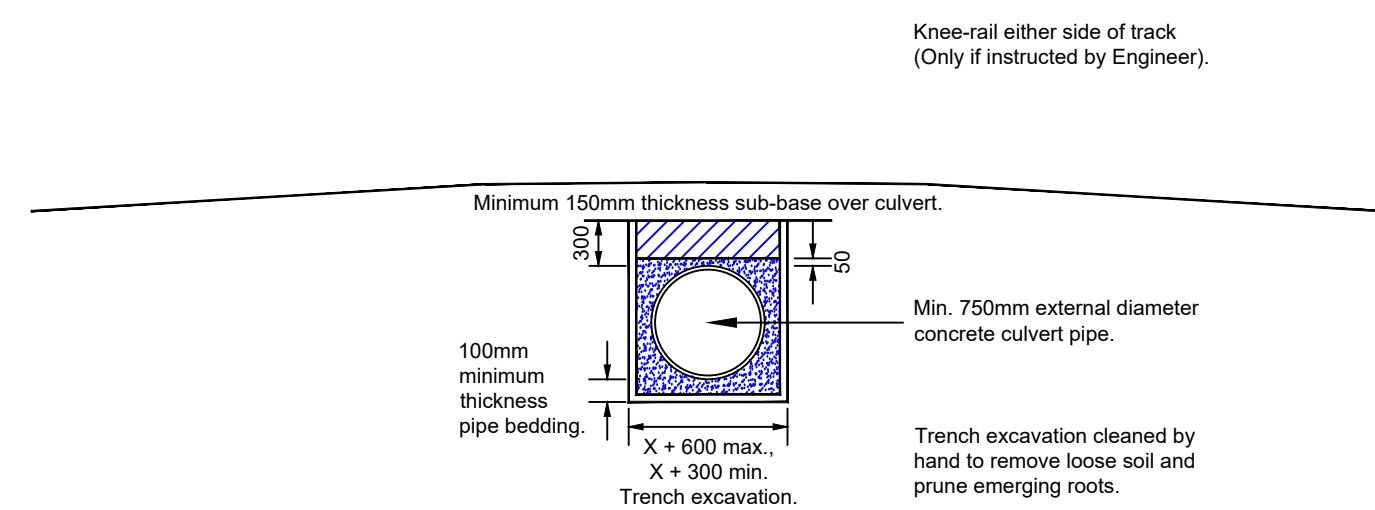
ROAD CONSTRUCTION ON GROUND WITH CROSSFALL

NOTES :-

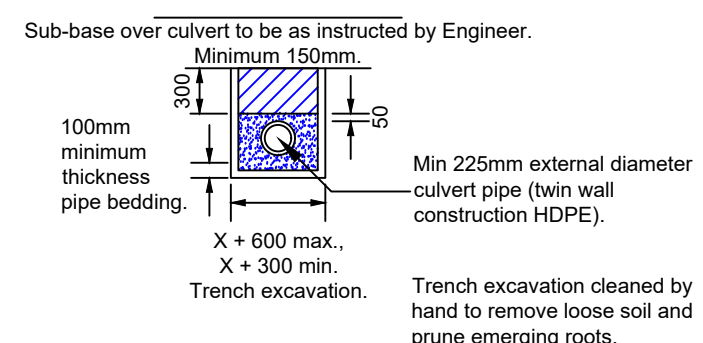
- The finished road must be capable of withstanding full highway loading under all weather conditions and in particular be capable of supporting a fully laden 41 Tonne articulated vehicle, as described in The Construction and Use Regulations, without permanent distortion of the road surface.
- For testing purposes a fully laden 4 axle 32 Tonne vehicle shall traverse repeatedly and continuously over the whole length of the road at a maximum speed of 25 M.P.H. for a period of at least 1 hour involving at least 5 passes. The road paving and its foundations shall not exhibit any rutting, cracking or distortion or any other feature which may indicate failure of the road.
- The road paving shall be capable of withstanding the above test and shall comprise a base layer of 75mm - dust crusher run durable crushed rock, topped with a wearing layer (50mm thick) of approximately 19mm - dust durable crushed rock. The road paving shall be thoroughly compacted in layers by sufficient passes of a 6/40 Tonne vibrating roller to be able to withstand the testing by the 32 Tonne laden vehicle. The minimum thickness of road paving will be 300mm.
- Road paving thickness must reflect the CBR of the road formation (sub-grade).
- Any "soft spots" in the road formation must be removed and replaced by hard durable material which shall be thoroughly compacted.
- The minimum longitudinal gradient is to be 2%.
- The maximum longitudinal gradient is to be 8%.



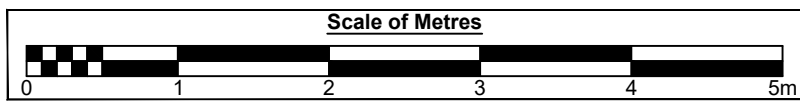
PIPE CULVERT DETAIL



TYPICAL CULVERT SURROUND DETAIL (Concrete Pipe)
(750mm External diameter culvert illustrated)
Type S Bedding Detail



TYPICAL CULVERT SURROUND DETAIL (Corrugated Plastic Pipe)
(225mm External diameter culvert illustrated)
Type S Bedding Detail



DO NOT SCALE FROM THIS DRAWING

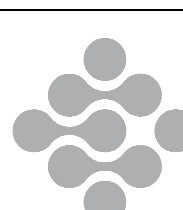
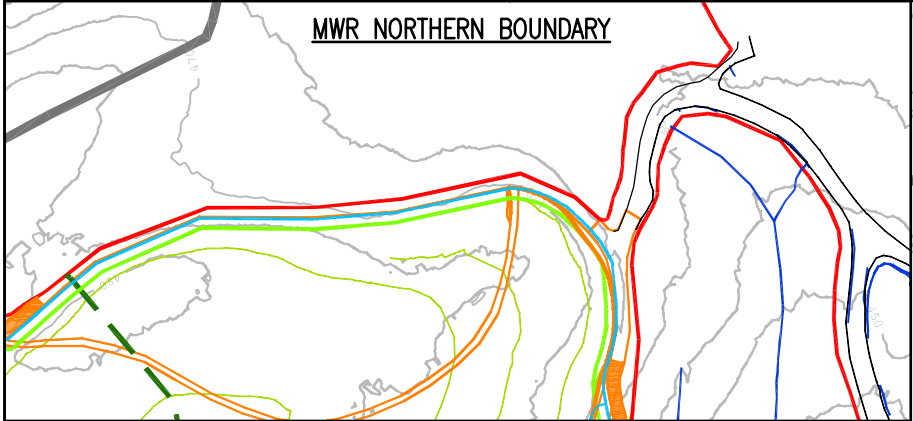
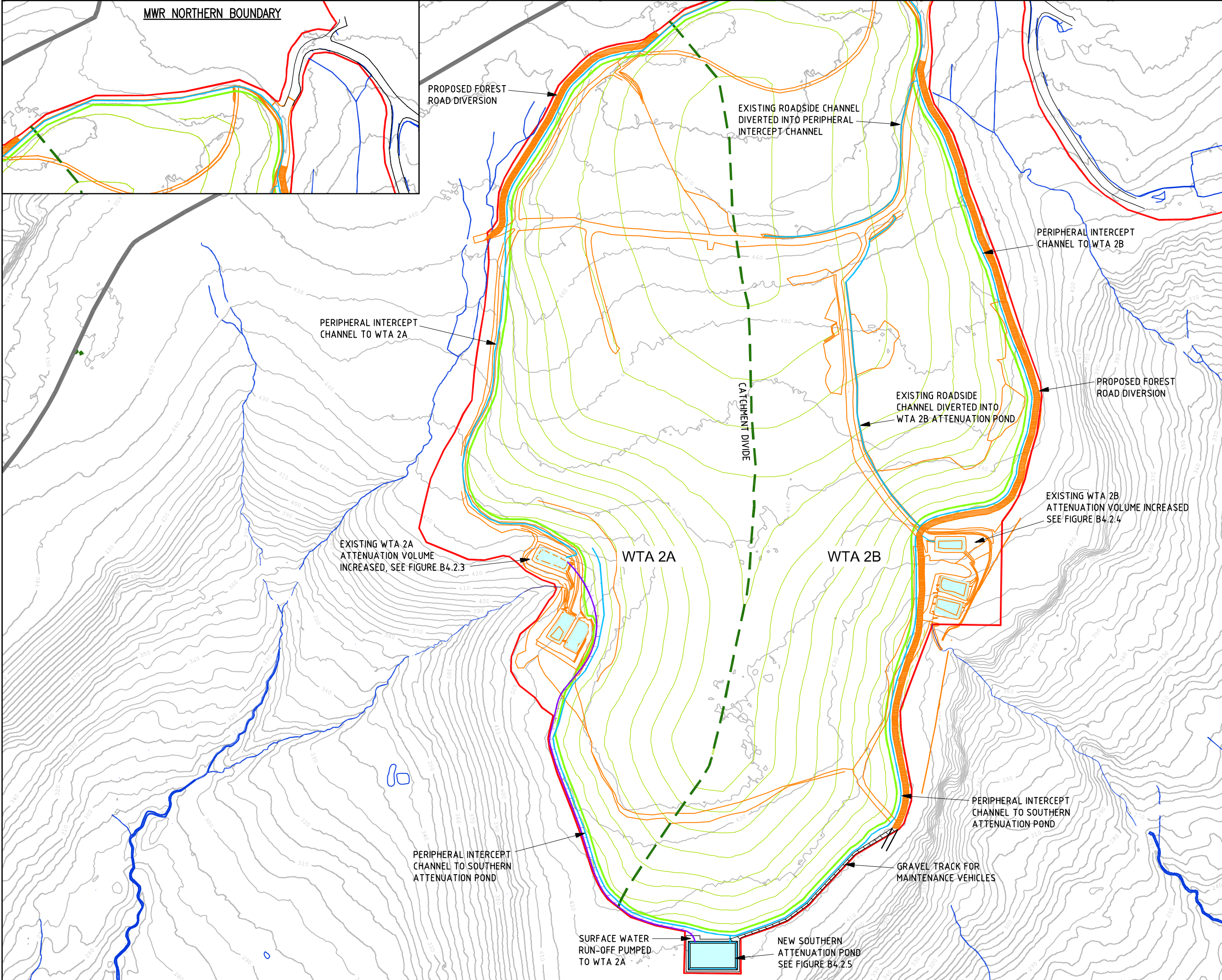
METHOD		DUTIES		DATE		DRAWN		CHECKED	
CLIENT									
 Energybuild									
PROJECT									
MINE WASTE REPOSITORY P2014/0729 - CONDITIONS 69 & 72 RESTORATION & AFTERCARE SCHEMES									
DRAWING TITLE									
STANDARD DETAILS FOR PERMANENT INFRASTRUCTURE									
DRG. NO.				REV		SAT. CODE			
CA12936-010									
DRG. SIZE		SCALE		DATE					
A0		1:50 @ A0		OCTOBER 2023					
DRAWN BY				CHECKED BY		APPROVED BY			
DNH									
 wardell armstrong 									

FIGURE 9.15

Mine Waste Repository SW Management Plan



NOTES

SEE ENVIRONMENTAL STATEMENT CHAPTER 6 AND DRG CA10649-006 FOR SITE RESTORATION DESIGN SHOWING THE FINAL LANDFORM AND SURFACE WATER DRAINAGE SYSTEM.

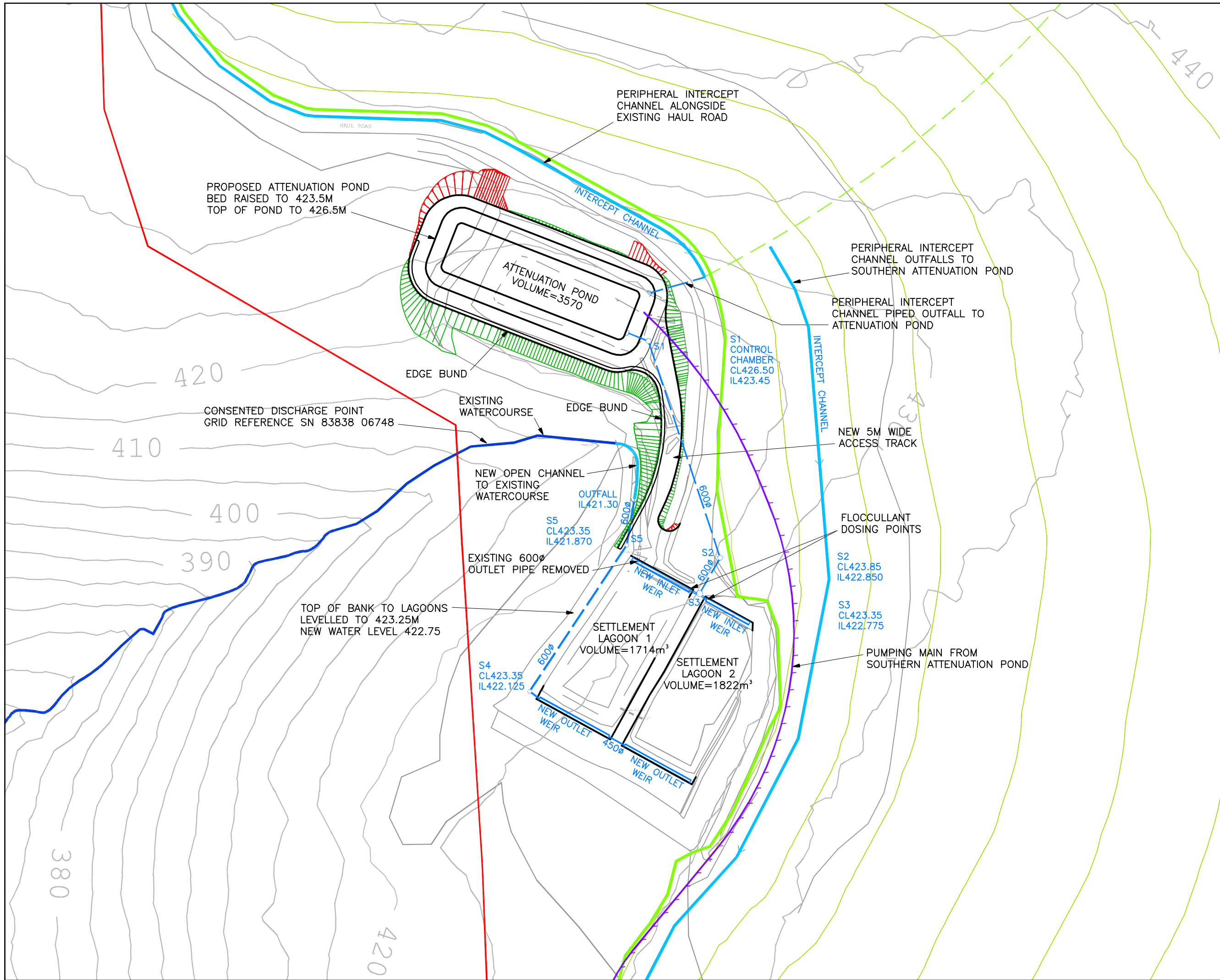
LEGEND

- PLANNING APPLICATION BOUNDARY
- EDGE OF FILL EARTHWORKS BOUNDARY
- PROPOSED FOREST ROAD DIVERSION
- EXISTING SITE FEATURES
- DRAINAGE CHANNEL
- STORM PUMPING MAIN
- EXISTING WATERCOURSE
- PROPOSED CONTOURS
- EXISTING CONTOURS

A FIRST ISSUE			30oct13
Revision Details		By	Date
UTC ASSOCIATES Property Development Consultants 20A Pantbach Road Birchgrove Cardiff CF14 1UA Tel 029 2061 2311 email: mikeurusi@utcassociates.co.uk			
Project			
ABERPERGWM MINE PLANNING APPLICATION 2013			
Title MINE WASTE REPOSITORY OPERATIONAL SURFACE WATER MANAGEMENT PLAN			
Scale at A3 1:5000			
Drawn		Date 8/6/2013	
Checked		Date	
Project No: 2310			
Drg No: FIGURE 9.15			

FIGURE 9.16

Mine Waste Repository WTA 2A Layout



LEGEND

- PLANNING APPLICATION BOUNDARY
- EDGE OF FILL EARTHWORKS BOUNDARY
- PROPOSED MINE WASTE REPOSITORY CONTOURS
- DRAINAGE CHANNEL
- STORM PUMPING MAIN
- SW DRAINAGE PIPE
- STORM OUTLET HEADWALL
- EXISTING WATERCOURSE

A	FIRST ISSUE	30oct13
Revision Details		By Date

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Project

**ABERPERGWM MINE
PLANNING APPLICATION
2013**

Title

**MINE WASTE REPOSITORY
WTA 2A LAYOUT**

Scale at A3

1000

Drawn	Date
Checked	Date

Project No:

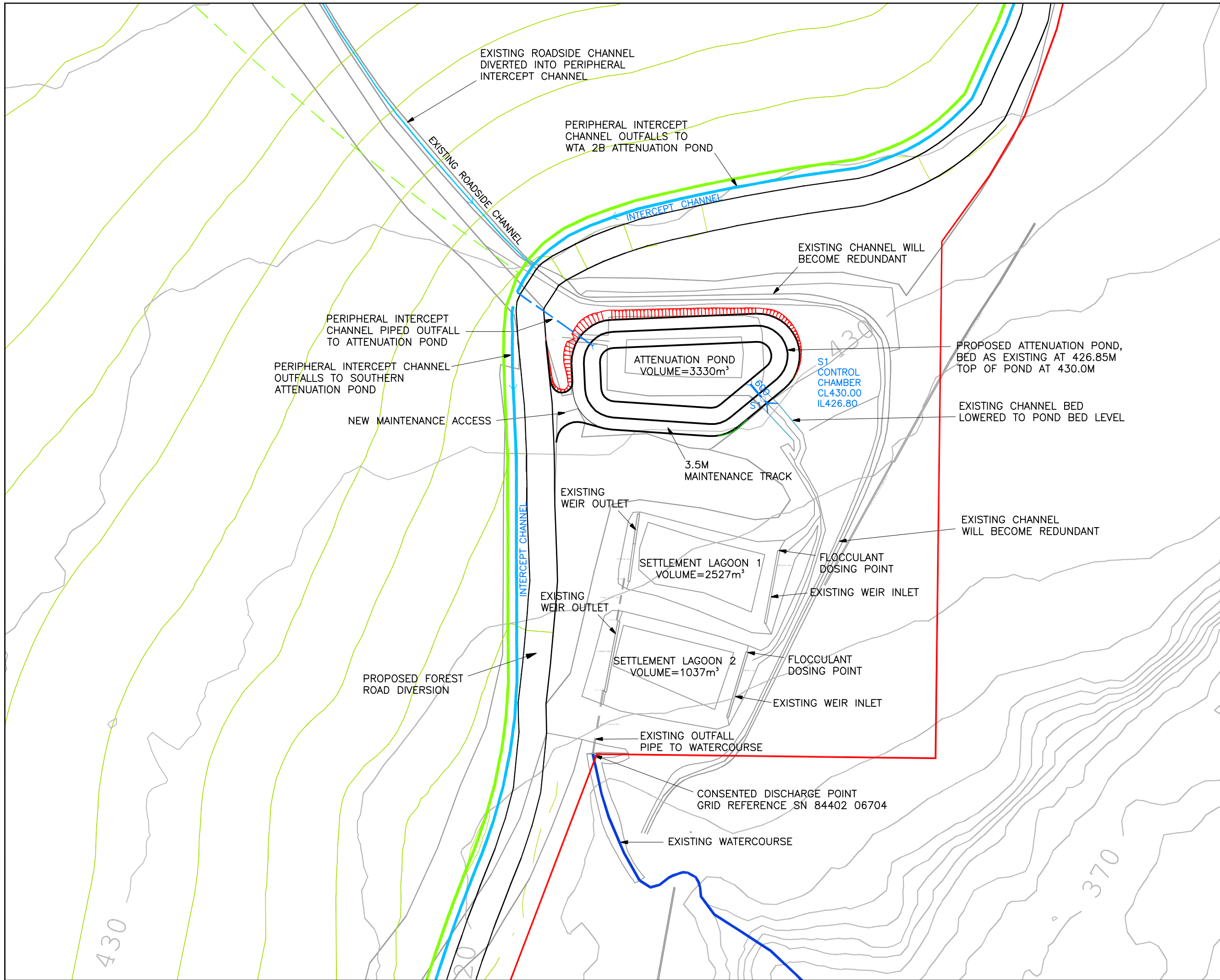
2310

Drg No:

FIGURE 9.16

FIGURE 9.17

Mine Waste Repository WTA 2B Layout



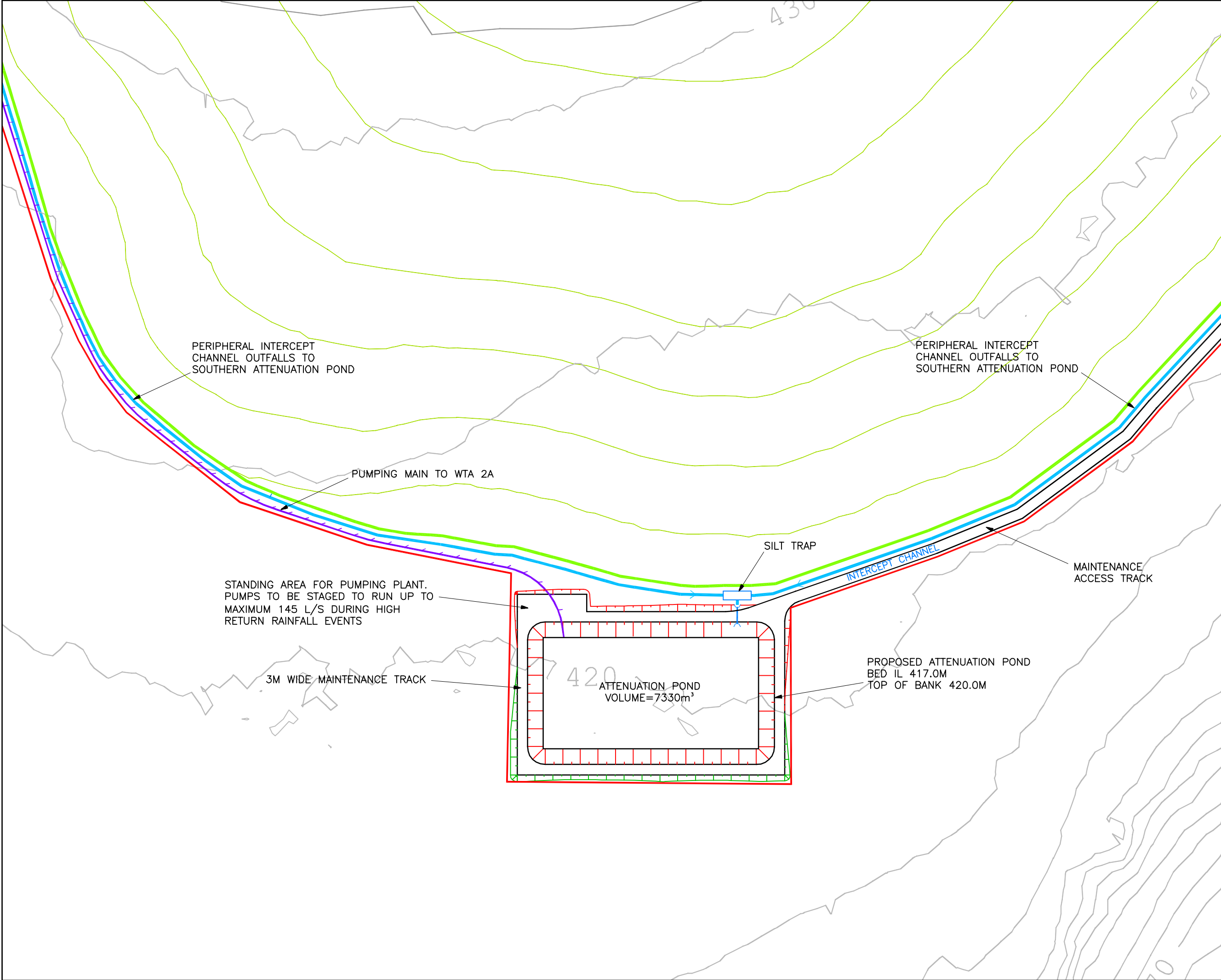
LEGEND

- PLANNING APPLICATION BOUNDARY
- EDGE OF FILL EARTHWORKS BOUNDARY
- PROPOSED MINE WASTE REPOSITORY CONTOURS
- DRAINAGE CHANNEL
- STORM PUMPING MAIN
- SW DRAINAGE PIPE
- STORM OUTLET HEADWALL
- EXISTING WATERCOURSE

A	FIRST ISSUE	30oct13
Revision Details	By	Date
UTC ASSOCIATES Property Development Consultants 20A Pantbach Road Birchgrove Cardiff CF14 1UA Tel 029 2061 2311 email: mikeurusi@utcassociates.co.uk		
Project		
ABERPERGWM MINE PLANNING APPLICATION 2013		
Title		
MINE WASTE REPOSITORY WTA 2B LAYOUT		
Scale at A3		
1:1000		
Drawn	Date	
Checked	Date	
Project No:		2310
Drg No:		FIGURE 9.17

FIGURE 9.18

Mine Waste Repository Attenuation Pond



LEGEND

- PLANNING APPLICATION BOUNDARY
- EDGE OF FILL EARTHWORKS BOUNDARY
- PROPOSED MINE WASTE REPOSITORY CONTOURS
- DRAINAGE CHANNEL
- STORM PUMPING MAIN
- SW DRAINAGE PIPE
- STORM OUTLET HEADWALL
- EXISTING WATERCOURSE

Revision	Details	By	Date
A	FIRST ISSUE		30oct13

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Project

**ABERPERGWM MINE
PLANNING APPLICATION
2013**

Title

**MINE WASTE REPOSITORY
ATTENUATION POND**

Scale at A3

1:1000

Drawn	Date

Checked	Date

Project No:

2310

Drg No:

FIGURE 9.18

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Middlebrook
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