

Ffos-y-Fran: Final Restoration Strategy

Greenhouse Gas Assessment

1. Introduction

- 1.1. The winning and working of coal has been undertaken at the Ffos-y-Fran surface coal mine in Merthyr Tydfil since 2007 under planning permission granted on Appeal in 2005 and subsequently revised on Appeal in 2011 (Appeal refs: A-PP 152-07-014 and APP/U6925/A/10/2129921). Under Condition 50 of the planning permission a Restoration Strategy has been agreed with the mineral planning authority, Merthyr Tydfil County Borough Council ('MTCBC'). The approved Restoration Strategy set out the sequence and phasing of the backfilling and reclamation of the coal mine and aftercare.
- 1.2. Areas of the mine have subsequently been progressively restored under the agreed Strategy. Operational activities at the mine ceased in November 2023 and revised final restoration proposals (the 'Scheme') are now to be submitted by Richards, Moorehead & Laing Ltd ('RML'), on behalf of Merthyr (South Wales) Ltd ('MSW'), to MTCBC as required under Condition 52 of the planning permission.
- 1.3. In this following report the term 'Site' refers to the area that is subject to the existing planning permission. It therefore includes the areas that are to be subject to final restoration along with those areas that have already been progressively restored and are not to be subject to further major earthworks as part of the Scheme.
- 1.4. Smith Grant LLP (SGP) has been instructed to undertake a Greenhouse Gas Assessment (GHGA) of the Scheme to inform the Environmental Impact Assessment (EIA) and Environmental Statement (ES) to be provided in support of the submission. This following GHGA has been prepared based on a review of information on the Scheme and existing consented restoration strategy. The assessment has focused on the potential greenhouse gases (GHGs) that may be released both directly and indirectly arising from the combustion of fuels on Site as part of the proposals.
- 1.5. This GHGA supplements a separate Air Quality Assessment (AQA) prepared by SGP¹ and has been used to inform the Air Quality and Greenhouse Gas Emissions Chapter of the ES.

2. Existing and Proposed Development

2.1. Existing Development

- 2.1.1. The Site comprises the former Ffos-y-Fran surface coalmine covering circa 400 hectares (ha) lying about 1.5km to the east of Merthyr Tydfil town centre. As described in Chapter 3 of the ES

¹ Smith Grant LLP, Ffos-y-Fran, Final Restoration Strategy, Air Quality Assessment, R3326-R01-v2, December 2024

the existing baseline conditions at the Site are taken as those existing at the end of the operational period of coal extraction at the end of November 2023.

2.1.2. The Site primarily comprises the following key features:

- **Overburden mounds OB1, OB2 and OB3:** formed during recent surface mining operations that commenced in 2007;
- **Pit Lake:** the main void which has naturally filled with water since cessation of the operational phase and removal of water pumps;
- **Phase 1 Restored Area:** area backfilled and previously restored to grassland; comprises about 62 ha in the western area of the Site;
- **Phase 2A Interim Restoration Area:** comprising Areas 2, 4, 4A, 5, 6, 7 and 8; although not completed as of the end of November 2023 restoration of this area is now complete and does not form part of the Scheme; comprises about 54 ha to the east of the Phase 1 area;
- **Workshop Area:** area of workshop buildings and parking for on-site plant vehicles.

2.2. Further Consented Restoration Works

2.2.1. The planning permission A-PP 152-07-014 and subsequent APP/U6925/A/10/2129921 included for an approved restoration scheme. Under the approved strategy it is a requirement to submit and agree the final detailed plans in phases, prior to the completion of each defined phase.

2.2.2. Under the existing approved strategy works are required to achieve the final restoration profiles:

- Returning overburden in the overburden mounds OB1, OB2 and OB3 in the voids;
- Placement of sub-soils, topsoil and soil forming materials.

2.2.3. Phase 1 and Phase 2A have been undertaken in accordance with the approved restoration strategy and are now complete. However, as described in the EIA Scoping Report² the consented scheme would require filling the void with approximately 26 million cubic metres (m³) of on-site stored overburden material along with additional earthworks to achieve the consented final restoration contours across the wider Site.

2.3. Proposed Revised Restoration Proposals

2.3.1. Proposals are to vary the current approved restoration strategy. The proposals briefly comprise:

- Selectively reduce the height of OB1 and re-profile the upper reaches;
- Re-profile the slopes leading down to the base of the void below the sidewalls and on the current western backfill slope;
- Retention of the existing pit lake within the void as a permanent body of water;

² Richards Moorehead & Laing, Ffos y Fran Final Restoration Strategy, Environmental Impact Assessment (EIA) Scoping Report, July 2024

- Retention of overburden mounds OB2 and OB3 largely as currently other than some minor earthworks to soften the engineered profiles;
- Range of surface vegetation treatments, including to OB3;
- Retention of some of the existing haul road routes as narrow plateaus and grassed tracks.

2.3.2. The detailed phasing is provided in RML plans 3274-RML-DR-L-53A-D. These works would require the movement of circa 2.5M m³ of materials. Final restoration would be to a combination of grassland and waterbodies. As under the current consented scheme there would not be importation of any materials for restoration.

2.3.3. The final restoration strategy is to be implemented over a 2-to-3-year period. On completion the restored landform would be subject to a 5-year maintenance period to enable grass seeding and tree planting to establish.

3. Legislation, Planning Policy and Guidance

3.1. Technical Context

3.1.1. Greenhouse gases (GHGs) are gases in the earth's atmosphere that trap heat. This is a natural greenhouse effect that serves to maintain the earth's temperature. However as human activities increase the release of greenhouse gases this results in global warming and climate change.

3.1.2. The six main GHGs are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆). The primary ones of interest in relation to the Scheme are those released through the combustion of fossil fuels, namely CO₂, CH₄, and N₂O.

3.2. International Legislative Context

3.2.1. The United Nations Framework Convention on Climate Change (UNFCCC) entered into force on 21 March 1994. The ultimate objective of the Convention is to stabilize greenhouse gas (GHG) concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system." Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner.

3.2.2. The treaty is not legally binding but it has provided the basis for subsequent international climate negotiations such as the Kyoto Protocol and the Paris Agreement and been used to set legally binding emissions limits.

3.2.3. The **Kyoto Protocol** to the UNFCCC was an international agreement to reduce GHG emissions. Under the subsequent **Paris Agreement**, the member states of the UNFCCC are required to set targets to reduce GHG emissions, with an overarching goal to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels” and pursue efforts “to limit the temperature increase to 1.5°C above pre-industrial levels.” These targets are known as Nationally Determined Contribution (NDCs). Following the UK’s withdrawal from the EU in 2020, the UK established its own NDC with the UNFCCC. In the UK’s NDC, it commits to reduce GHG emissions to 68% of 1990 levels by 2030.

3.3. National Legislative Framework

3.3.1. The **Climate Change Act 2008** is the basis of the UK’s response to tackling climate change. The Act established a legally binding objective to reduce UK GHG emissions (carbon dioxide and other gases) by 80% of 1990 levels by 2050. This was later amended with a new objective to reach net zero by 2050.

3.3.2. The **Carbon Plan 2011** sets out the UK’s plans to achieve reductions in GHG emissions and decarbonisation as required by the Climate Change Act. Critical areas identified as requiring a transition to low-carbon alternatives included electricity generation, home and business heating, and transport power.

3.3.3. The Climate Change Act also introduced a system of ‘carbon budgets’ to act as interim targets on the way to achieving the 2050 objective. Each carbon budget runs for a five-year period and restricts the amount of GHGs that the UK can legally emit.

3.3.4. Under the **Environment (Wales) Act 2016**, the devolved Welsh government is required to set five-year carbon budgets for Wales to achieve the 2050 target set out by the 2008 Climate Change Act. Wales is currently in its **Carbon Budget 2** period, 2020 to 2025, and the limit on GHG emissions has been set at a 37% reduction from 1990 levels.

3.4. National Planning Policy and Guidance

3.4.1. **Planning Policy Wales**³ sets out the Welsh Government’s planning policies for Wales and how these are expected to be applied. Section 5.7 (‘Energy’) of the PPW sets out an ‘Energy Hierarchy for Planning,’ which sets out the five approaches that local authorities should use to reduce carbon emissions via planning policies and decisions, from reducing energy demand and increasing energy use efficiency, to increasing renewable energy generation and minimising carbon intensive energy generation.

3.4.2. Paragraph 5.7.13 states that *‘the Welsh Government expects all new development to mitigate the causes of climate change in accordance with the energy hierarchy for planning.’*

³ Welsh Government, Planning Policy Wales, Edition 12, published February 2024

3.5. Local Planning Policy and Guidance

3.5.1. MTCBC adopted the **Replacement Local Development Plan**⁴ in 2018. The plan has no specific policies relevant to both greenhouse gas emissions and restoration schemes, but generally emphasises a commitment to the sustainability objective *'to minimise the contribution to climate change whilst maximising resilience to it.'*

3.6. Additional Guidance and Best Practice

3.6.1. The IEMA **Assessing Greenhouse Gas Emissions and Evaluating Their Significance**⁴ document provides non-statutory guidance and an outlined approach to assessing GHG emissions associated with an EIA development project.

3.6.2. The Government **Environmental Reporting Guidelines**⁵ document provides mandatory guidance to companies that are required to report GHG emissions. The guidance is supported by an official set of UK Government conversion factors⁶ that can be used to calculate GHG emissions from a range of activities including energy use, water consumption and transportation.

3.7. The 'Finch' Judgement

3.7.1. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 require Environmental Impact Assessments (EIAs) to 'identify, describe and assess' the 'direct and indirect significant effects' of a project on, among other things, the air, **climate** and landscape.

3.7.2. Such EIAs have typically included an assessment of the direct and indirect GHG emissions associated specifically with a development, e.g. those arising from use of fuels in non-road machinery and materials use within the project during the construction phase and any subsequent combustion of fuels during the operational phase.

3.7.3. However, in a judgment handed down on 20 June 2024, *R (Finch) v Surrey County Council and others [2024] UKSC 20*¹, the Supreme Court of the United Kingdom ruled that GHG emissions arising from the eventual downstream use of hydrocarbons produced from a proposed oil development ('Scope 3') should have been assessed in an environmental impact assessment (**EIA**) process carried out by a local authority. The Court determined that the oil produced by the project would inevitably be refined and eventually combusted, resulting in Scope 3 greenhouse emissions.

3.7.4. A key point noted in the judgement was that the combustion of the oil was considered inevitable in relation to the specific proposals. Hence where an EIA is required for projects involving the new or expanded extraction of oil or other hydrocarbons downstream Scope 3 emissions should now be included. It should however also be noted that the judgement was that the Scope 3 GHG

⁴ Merthyr Tydfil County Borough Council, Replacement Local Development Plan (2016 - 2031), adopted December 2018

⁵ Department for Energy Security and Net Zero, Department for Environment, Food and Rural Affairs and Department Business, Energy & Industrial Strategy, Environmental Reporting Guidelines: Including Streamlined Energy and Carbon Reporting requirements, published 12 June 2013, last updated 29 March 2019

⁶ Department for Energy Security and Net Zero, Greenhouse Gas Reporting: conversion factors 2024; published 8 July 2024, last updated 30 October 2024

emissions should have been assessed as part of the EIA undertaken in relation to the planning application. It was not whether the local authority should also have regard to the *nature and extent* of such downstream emissions.

3.7.5. Although the Finch judgement specifically related to a project involving fossil fuel extraction and downstream use the ruling may have implications for other types of proposed development where a resulting materials or product may have a downstream use. However, the Scheme being considered within this GHGA does not result in production of a material with a potential downstream use and hence the Finch judgment is not applicable.

4. Greenhouse Gas Assessment

4.1. Methodology

4.1.1. In undertaking the greenhouse gas assessment (GHGA) the following has been carried out:

- Collation of available development data;
- Determination of principal potential direct and indirect GHG emissions sources associated with the operations;
- Collation of information on GHG emissions conversion factors;
- Calculation of predicted GHG emissions from the Scheme.

4.1.2. The proposed Scheme solely relates to the restoration of the Site through the relocation of existing materials onsite and subsequent surface treatment (hydroseeding, landscaping etc). There would not be any importation of material on site, or exportation off-site. There would not be any mineral extraction or any processing activities. The Scheme would not result in the production of any material that may result in subsequent generation of greenhouse gases, either onsite or 'downstream'. As such the primary activities associated with the Scheme involve material movement using bulldozers, an excavator and dump trucks as discussed further below in Section 4.2.

4.1.3. The principal sources of GHGs considered in the assessment are therefore:

- Direct emissions:
 - on-site emissions – on-site and plant machinery;
- Indirect emissions:
 - emissions associated with the production of fuel used in the project (termed Well-to-Tank (WTT)).

4.1.4. The total tonnes of potentially released GHGs have been estimated for each element above. To enable assessment of the overall global warming potential, or 'carbon footprint', of the project, the mass of carbon dioxide equivalent (tCO₂e) is calculated for each GHG using an appropriate global warming potential (GWP) factor for that gas. The GWP of CO₂ is standardised to 1. The relevant GWPs referred to for CH₄ and N₂O are 25 and 298 respectively as provided in the Defra guidance⁵ and are consistent with those officially accepted for use under the UNFCCC.

4.1.5. The tonnes of CO₂e (tCO₂e) for each element have been estimated using appropriate conversion factors, where such conversion factors are either provided as a unit of distance travelled (i.e., as miles or km) or a unit of material (e.g. litres of fuel) and are used to convert the unit into the associated carbon emissions (as tCO₂e) for that activity.

4.1.6. The primary source of conversion factors used in this assessment are those released by Defra in 2024⁶.

4.2. Assessment of Significance

4.2.1. There is no current available methodology to determine the significance of the GHG emissions associated with a Proposed Development under the planning regime. IEMA guidance⁴ is that '*it might be considered that all GHG emissions are significant and that an EIA should ensure a project addresses their occurrence by taking mitigating action.*'

4.2.2. Notwithstanding this, EIA traditionally works on the principle of significance. To provide some context to enable an assessment of 'significance' the assessment therefore compares the proposed Scheme related GHG emissions with those that may be released by the currently consented Restoration Strategy.

4.3. Assessment

Proposed Scheme

4.3.1. The operation of non-road mobile machinery (NRMM) and plant on the Site during the Scheme would give rise to direct and indirect (WTT) emissions of GHGs. MSW has determined the NRMM that would be required for the works and estimated the fuel use based on the quantity of material requiring movement, type of equipment to be used, distance to be travelled and duration of operation.

4.3.2. It is noted that all NRMM associated with the earthworks would be parked at the Workshop Area, close to the void, with no access to the CDP required on a day-to-day basis. The majority of material is expected to be regraded using bulldozers with minimal requirements for excavation and haulage.

4.3.3. It is estimated that the final restoration works would require the movement of about 2.5M m³ of material using tracked dozers (1 x Cat D11, 2 x Cat D10 and 4 x Cat D9). Some additional

excavation works to handle in the order of 250k m³ of material would be required utilising an excavator (Hitachi EX1200 or Kamatsu 1250), dump trucks (5 x Bell B50 articulated dump trucks) and a tracked dozer (1 x Cat D9) for a short period of time. There would also be a requirement for use of pumps (2 x Pioneer CX150 pumps) over a 6-month period to remove some water from the void to enable grading of the lower slopes.

4.3.4. The resulting estimated fuel requirement (as estimated MSW) and resulting total direct and indirect tCO₂e are summarised below in Table 4.1.

Existing Consented Scheme

4.3.5. MSW has estimated the current consented strategy would require the movement of about 26M m³ of material. This would require the use of a variety of NRMM including Cat D9 dozers, Cat 824 wheeled dozers, and Cat 16H graders, PC3000 excavators and Cat777 dump trucks. The resulting estimated fuel requirement and resulting total direct and indirect tCO₂e are summarised below in Table 4.1.

Table 4.1: Estimated GHG Emissions

Work	Fuel Use (l) ¹	Direct		Indirect	
		GHG Conversion Factor ²	tCO ₂ e	GHG Conversion Factor ²	tCO ₂ e
Proposed Scheme					
Dozer Work	1,327,195	2.755	3,657	0.627	832
Excavation	273,892		755		172
Pumping	490,000		1,350		307
Sub-total	2,091,087		5,762		1,310
Total					7,072
Consented Scheme					
Dozer & excavation work	19,128,000	2.755	52,705	0.627	11,987
Total					64,692

1: As provided by MSW

2: Government greenhouse gas conversion factors issued in 2024 for medium gas oil used in diesel engines (red diesel)³

4.3.6. There would be some additional NRMM requirements for ancillary support and soiling and agricultural operations. However, these would be similar whichever scheme is adopted and hence have not been considered further.

4.3.7. Additional sources of GHG emissions associated with both the proposed and consented schemes including fuel use for staff travel and downstream welfare water use, waste and wastewater treatment. The consented scheme would be expected to result in more such GHG emissions compared to the proposed scheme as it would require more staff and would be for a

longer duration. However, these are not considered to be of significance for either scheme in comparison to the GHG emissions associated with NRMM fuel use and hence have not been considered further.

4.3.8. With reference to Table 4.1 the proposed Scheme would result in substantially less GHG emissions than the currently consented scheme.

4.4. Mitigation

4.4.1. Mitigation of GHG emissions during the Scheme itself is achieved through:

- minimising the quantity of material requiring moving and hence reducing the size of required NRMM and duration of use;
- minimising the requirement for internal haulage with most work being carried out by dozers in-situ;
- carrying out regular servicing and maintenance of on-site NRMM and plant to ensure it operates efficiently.

5. Summary

5.1. The GHG assessment has considered the potential for the generation and release of GHGs during the Scheme. The assessment has considered the potential GHGs that may be released both directly and indirectly during the restoration works.

5.2. The assessment has focused on the primary source of GHGs, namely the combustion of fuel in NRMM used to move the material to achieve the required restoration contours. The total quantities of potential GHG emissions that may arise directly and indirectly from fuel combustion have been estimated.

5.3. To enable assessment of the significance of these emissions, they have been compared to those predicted to result from the current consented restoration scheme.

5.4. Both the proposed Scheme and currently consented scheme would result in additional fuel use and hence direct and indirect GHG emissions from the subsequent soiling and agricultural activities to complete the restoration. However, these are expected to be similar for both schemes and have not been considered further.

5.5. In addition, indirect GHG emissions would arise associated with water use and downstream waste and waste-water treatment. However, these would be insignificant compared to the GHG resulting from fuel usage and have not been considered further.

- 5.6. GHG emissions from the use of fuel during the Proposed Scheme are estimated at 7,072 tCO_{2e}. For comparison the estimated GHG emissions that would arise from the existing consented scheme are **substantially** higher at 64,692 tCO_{2e}.
- 5.7. The Scheme incorporates in-built mitigation measures primarily through the minimisation of quantity of material requiring movements to achieve restoration, and hence reducing the need for NRMM and reducing the need for internal haulage.
- 5.8. It should also be noted the GHG emissions associated with the proposed scheme (and the consented scheme) would be substantially less than those associated with the coaling operations which were undertaken until November 2023. These operations would also have had downstream GHG emissions associated with the transport and subsequent combustion of the coal extracted on the Site.
- 5.9. On the basis of the above, the GHG emissions that would be generated by the proposed Scheme should not be considered significant or preclude the granting of planning permission. No further assessment or consideration of GHG emissions is deemed necessary.

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