

# *Worcestershire Minerals Local Plan Background Document*

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## *Coal mining in Worcestershire September 2018*

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# 1. EXECUTIVE SUMMARY

- 1.1. Coalfields in Worcestershire are restricted to the north of the county, to the west of Kidderminster and just south of Stourbridge. These are part of larger coalfields that extend north of the county. The last coalpit in Worcestershire closed in 1972. No applications for coal working have been received in Worcestershire in the last 25 years and all applications in the 10 years prior to this were refused.
- 1.2. CoalPro and the Coal Authority have confirmed that there is no surface coal resource in any meaningful sense in Worcestershire<sup>1</sup> and that, although deep coal reserves do exist at present, the cost of establishing new, modern, deep mines would be prohibitive even if suitable resources existed. Both organisations have confirmed that they have no interest in developing new coal mines in the county. They have also confirmed that they are not aware that there are any other minerals that might be viable to extract in association with the coal strata.
- 1.3. There is a legacy of historic mining workings in the Wyre Forest Coalfield. The Coal Authority's records indicate there are 237 recorded mine entries in Worcestershire and three surface hazards have also been reported. The Coal Authority has defined Coal Mining Development Referral Areas for each coalfield local authority as having the potential for instability or a degree of risk from the legacy of coal mining operations. Both 'High Risk' and 'Low Risk' areas have been identified in Worcestershire for this coalfield.

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<sup>1</sup> At a meeting with WCC Planning Officers at County Hall, Worcester on 13<sup>th</sup> August 2013 the Coal Authority and CoalPro stated that although the BGS geological maps do show coal to be present (in the precise sense that identifiable strata exist within current operational horizons) they consider the deposits in Worcestershire to be thin to the point of fragmentary and of no commercial value.

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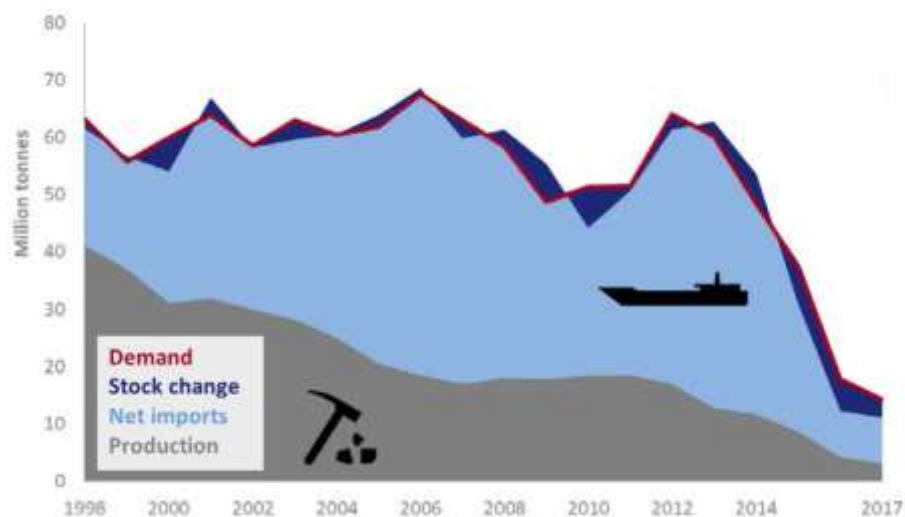
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### 3. COAL AND COAL MINING IN THE UK

#### COAL IN THE UK

- 3.1. Coal has been used as an energy source in the UK for many centuries and, until the extraction of gas from the North Sea, it was the main source of power for the country. Coal extracted in the UK is used for several different applications including electricity generation, heat generation, coke manufacture and use in blast furnaces. The industry has been in decline since the 1970s and the UK has been a net importer of coal since the mid 1980s. Latest reports state that "coal production fell by 27 per cent [in 2017] compared to [2016], down to an all-time low of 3 million tonnes, just under a tenth of the production recorded at the start of the century, with the reduction "due to the last large deep mines closing in 2015 and a continued reduction in demand from electricity generators".<sup>2</sup>

Figure 1 UK coal supply and demand to 2017<sup>3</sup>



- 3.2. Coal accounts for about 15 per cent of total energy demand in the UK<sup>4</sup>. In 2017, output from coal mines in England was 1.0 million tonnes, down from 4.9 million tonnes in 2015<sup>5</sup>. Nevertheless, OFGEM have stated that "...in the next decade [...] coal will continue to provide a steady but a decreasing share of the total power supply"<sup>6</sup>.

<sup>2</sup> National Statistics/Department for Business, Energy and Industrial Strategy (July 2018) *Digest of UK Energy Statistics 2018*

<sup>3</sup> National Statistics/Department for Business, Energy and Industrial Strategy (July 2018) *Digest of UK Energy Statistics 2018*

<sup>4</sup> National Statistics/Department for Business, Energy and Industrial Strategy (July 2018) *Digest of UK Energy Statistics 2018*

<sup>5</sup> National Statistics/Department for Business, Energy and Industrial Strategy (July 2018) *Digest of UK Energy Statistics 2018*

<sup>6</sup> Keijonen, M (09 September 2016) *What drives Great Britain's electricity generation mix?* OFGEM [online] available at <https://www.ofgem.gov.uk/news-blog/our-blog/what-drives-great-britain-s-electricity-generation-mix> Accessed 26.09.2018

Figure 2 Coal production in the UK 2012-2017 (millions of tonnes)<sup>7</sup>

	2013	2014	2015	2016	2017
<b>Total output</b>	13	12	9	4	3
<b>Deep-mined</b>	4	4	3	0	0
<b>Opencast</b>	9	8	6	4	3
<b>Imports</b>	51	42	23	8	8

- 3.3. There are two methods of mining coal in the UK. The first is surface mining (also known as 'opencast', although this term is now less favoured), which is essentially quarrying and involves the removal of layers of soil and covering strata and then the mining of the coal present near the surface. To be surface mined, the coal must be within 100m of the surface. In 2017 there were 17 opencast sites in the UK<sup>8</sup>. There has been no recent history of surface mining in Worcestershire. The second type of coal mining is deep mining. This involves mining through shafts and tunnels. There are two methods of deep mining: 'longwall', where mined areas are allowed to undergo controlled collapse, and 'pillar and stall' where pillars of coal are left in place to support excavation. The last active mine in Worcestershire was a deep mine. Because of the shallow depth, the pillar and stall mining technique was used. In 2017 there were only three operational deep coal mines in the UK.
- 3.4. Coal can also be exploited by other technologies, including Coalbed Methane Extraction and Underground Coal Gasification.
- 3.5. In the UK all coal resources are owned by the Coal Authority. The Coal Authority was established in 1994 as part of the privatisation of the coal industry. It distributes licences for companies to mine coal. Coalbed methane is not owned by the Coal Authority, but instead is owned by the Crown, as set out in the 1998 Petroleum Act.

## COALBED METHANE AND UNDERGROUND COAL GASIFICATION

- 3.6. It is common for methane gas to be contained within coal seams, and this gas can be extracted for use in energy generation. However, this is dependent on the percentage of methane in the gas contained in the coal.
- 3.7. Producing coalbed methane involves drilling wells into the coal seams, which are dewatered. The methane is then extracted and compressed. It does not involve hydraulic fracturing of the rock, as undertaken in 'fracking'<sup>9</sup>. Instead of being stored in pore space in sandstone (like natural gas), coalbed methane is held on the surface of the coal.

<sup>7</sup> Department for Business, Energy and Industrial Strategy (undated) *Historical coal data: coal production, availability and consumption 1853 to 2017*.

<sup>8</sup> Department for Business, Energy and Industrial Strategy (undated) *Historical coal data: coal production, availability and consumption 1853 to 2017*.

<sup>9</sup> For further information see background paper on oil and gas, available at <http://www.worcestershire.gov.uk/mineralsbackground>.

- 3.8. Another developing use for coal is Underground Coal Gasification. This is a method that involves the extraction of gas from coal that would otherwise be uneconomic to extract<sup>10</sup>. Underground coal gasification involves the in situ gasification of coal deposits. To do this air or oxygen is pumped into the coal to cause a reaction which releases synthetic natural gas or 'coal gas'. The coal is subject to a controlled burn and a release of gas that is then pumped to the surface.
- 3.9. The Coal authority supports the use of underground coal gasification<sup>11</sup> and has issued exploration licences since 2009. Officers are not aware of any licences being issued in Worcestershire.

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<sup>10</sup> G Chapman et al (2005) *Summary of information on coal for land-use planning purposes*, BGS.

<sup>11</sup> The Coal Authority (December 2009) *Underground coal gasification: policy statement for licensing by the Coal Authority*.

## 4. COAL RESOURCES IN WORCESTERSHIRE AND SURROUNDING AREAS

- 4.1. The coal in Worcestershire, like most of the coal in the UK, is from the carboniferous group. It is found within the Lower, Middle and Upper coal measures. Within these groups the coal appears as seams of varying thickness. The depth of the workable seams helps to determine whether it is possible to work the coals in a surface mine or a deep mine. There are two small areas of Worcestershire that lie within coalfields, both to the north of the county.

### THE SOUTH STAFFORDSHIRE COALFIELD

- 4.2. The first is found at the southern end of the South Staffordshire coalfield just to the north of Bromsgrove. In this coalfield productive coal comes from either the lower coal measures or the middle coal measures. However, these productive measures are covered by 400m of barren Upper coal measures. There is no history of working this field in Worcestershire and it is not considered economically viable to mine at present.

### THE WYRE FOREST COALFIELD

- 4.3. The second area is at the southern end of the Wyre Forest Coalfield. This lies to the west of Kidderminster. This has had previous coal workings as recently as the 1970s, and was once a deep mine. The coal found in these areas is linked to other coalfields that were being actively exploited until June 2013<sup>12</sup>. There are two coal seams in the area, both of which belong to the Upper coal measures. They are the lower "hard coal seam" and the upper "thick or five foot seam".

### RESOURCES IN WORCESTERSHIRE

- 4.4. Both of the areas of coal found in Worcestershire represent small areas of larger coalfields. The British Geological Survey (BGS) consider that "these coalfields are unlikely to attract any further opencast (shallow surface) working".<sup>13</sup>
- 4.5. In discussions with CoalPro and the Coal Authority<sup>14</sup> it was suggested that most of the surface coal resources in the Wyre Forest Coalfield in Worcestershire were worked before 1870. In addition, although the BGS geological maps show surface coal to be present, this is because identifiable strata exist within geological horizons, and the deposits shown are thought to be very thin in Worcestershire (a matter of inches). As such, the Coal Authority's most recent plans do not show any surface coal resource in the county.
- 4.6. CoalPro and the Coal Authority<sup>15</sup> consider the coal resources shown on the Worcestershire Minerals Local Plan interactive minerals mapping tool to be

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<sup>12</sup> The Huntington Lane mine in Shropshire, as reported on the BBC news online (5 November 2013) *Restoration starts at Wrekin mine*, available at <https://www.bbc.co.uk/news/uk-england-shropshire-24825136> [Accessed 26.09.2018]

<sup>13</sup> BGS (1999) *Mineral Resource Information for Development plans: Herefordshire and Worcestershire*, page 22

<sup>14</sup> Advice given by the Managing Director of Coal Pro and Chief Planner/Manager for Local Authority Liaison for the Coal Authority, at a meeting at County Hall, Worcester on 13 August 2013.

<sup>15</sup> Advice given by the Managing Director of Coal Pro and Chief Planner/Manager for Local Authority Liaison for the Coal Authority, at a meeting at County Hall, Worcester on 13 August 2013.

'relict coal', which needs to be recognised as containing known and unknown hazards, rather than as areas of workable resource.

Figure 3 Map showing the Wyre Forest and South Staffordshire Coalfields.<sup>16</sup>



#### PREVIOUS COAL WORKINGS IN WORCESTERSHIRE

- 4.7. Coal working in Worcestershire was limited to the Wyre Forest coalfield, where there was a deep mine until the 1970s, with a relatively low output. In 1972 the mine was closed due to flooding. Since then there have been no active coal workings in Worcestershire.
- 4.8. In 1978 there was an application to work part of this coalfield as a surface mine<sup>17</sup>. The proposed mine was located at Hunthouse, just south of the village of Mamble, in the same area as previous workings in the Wyre Forest coalfield. The proposal was to extract 41,500 tonnes of coal over two years. Planning permission was refused because of the detrimental effect it would have on both local and county-wide highways. It was also thought that it would encourage other surface mining operations in the area, and this was not considered to be desirable.
- 4.9. In 1988 another small-scale (around 200 tonnes a week) deep mine was proposed at the site, but this too was refused planning permission<sup>18</sup>. It would have worked the thick seam, using deep, not surface mining. There has not been any interest in mining in the county since.

<sup>16</sup> Online datasets of the British Geological Survey (BGS), available at <http://www.bgs.ac.uk/GeoIndex/>.

<sup>17</sup> Worcestershire County Council planning reference number 407000.

<sup>18</sup> Worcestershire County Council planning reference number 407211.



Figure 4 Mining the face of Hunthouse mine in the Wyre Forest coalfield in 1970<sup>19</sup>



#### CURRENT ACTIVE SITES NEAR THE COUNTY

4.10. Officers are not aware of any active sites within the coalfields that extend into Worcestershire.

#### COALBED METHANE AND UNDERGROUND COAL GASIFICATION

4.11. Officers are not aware of any areas of Worcestershire that are currently licensed for coalbed methane extraction or underground coal gasification. These licences are not issued by the County Council. The BGS considers that on the basis of current evidence, coal found in Worcestershire is likely to be unsuitable for coalbed methane extraction or coal gasification<sup>20</sup>, owing to the low levels of methane gas contained within the coal.<sup>21</sup> The Coal Authority and CoalPro's advice is that although the techniques are theoretically possible, coalbed methane production or underground gasification would be unlikely to be viable in Worcestershire during the life of the plan<sup>22</sup>.

#### FUTURE PROSPECTS FOR COAL WORKING IN WORCESTERSHIRE

4.12. In summary, although there are coalfields in Worcestershire - and mining has taken place in the past - the BGS, Coal Authority, and CoalPro consider that the coalfields in Worcestershire are unlikely to attract any further mining interest in the near future for either coal extraction, coal gasification or coalbed methane production<sup>23</sup>. There is no evidence to suggest that the coalfields in

<sup>19</sup> Abberley and Malvern Hills Geopark: Archaeology and Industrial Heritage in the Geopark, available online at <http://geopark.org.uk/pub/2009/07/archaeology-and-industrial-heritage-in-the-geopark/> [accessed 26.09.2018]

<sup>20</sup> G Chapman (2005) *Summary of information on coal for land-use planning purposes*, BGS.

<sup>21</sup> BGS (1999) *Mineral Resource Information for Development plans: Herefordshire and Worcestershire*.

<sup>22</sup> Advice given by the Managing Director of Coal Pro and Chief Planner/Manager for Local Authority Liaison for the Coal Authority, at a meeting at County Hall, Worcester on 13 August 2013.

<sup>23</sup> BGS (1999) *Mineral Resource Information for Development plans: Herefordshire and Worcestershire*, BGS.

Worcestershire are suitable for, or that there is any interest in, underground gas or carbon storage.

## **SAFEGUARDING**

- 4.13. In the circumstances the County Council does not consider that it would be appropriate to safeguard any of the known coal resources in Worcestershire. The Minerals Local Plan will, however, include policies to ensure that the coal mining hazards identified in Worcestershire by the Coal Authority are identified.

## 5. PLANNING CONTEXT OF COAL MINING

- 5.1. Coal mining licences are granted by the Coal Authority, which owns all coal reserves in the UK. They grant licences to private businesses to work the coal. Any coal working will also have to gain planning permission. All proposals will need to be determined in accordance with the Development Plan unless material considerations indicate otherwise. The Development Plan in Worcestershire currently consists of the adopted City, Borough and District Local Plans, Neighbourhood Plans, the Waste Core Strategy Local Plan, and the 'saved' policies in the Hereford and Worcester Minerals Local Plan from 1997. This section sets out the national and local planning policy context. Proposals may well also require licences from the Coal Authority, water extraction or discharge licences, and waste or environmental permits from the Environment Agency.

### NATIONAL PLANNING POLICY FRAMEWORK

- 5.2. The National Planning Policy Framework (NPPF) contains policies on the development of mineral resources, including coal. The NPPF states that "When determining planning applications, great weight should be given to the benefits of mineral extraction, including to the economy".<sup>24</sup> It also states that planning policies should, among other things, "provide for the extraction of mineral resources of local and national importance"<sup>25</sup>, and defines such resources as "Minerals which are necessary to meet society's needs, including [...] shallow and deep-mined coal, oil and gas (including conventional and unconventional hydrocarbons)...".<sup>26</sup> It sets out a range of considerations that minerals planning authorities must take into account when considering proposals for minerals extraction, including impacts on the built and natural environment, health, noise, and dust. It also requires restoration and aftercare at the earliest opportunity.
- 5.3. In relation to coal, the NPPF sets out that "Planning permission should not be granted for the extraction of coal unless:
- a) the proposal is environmentally acceptable, or can be made so by planning conditions or obligations; or
  - b) if it is not environmentally acceptable, then it provides national, local or community benefits which clearly outweigh its likely impacts (taking all relevant matters into account, including any residual environmental impacts)."<sup>27</sup>
- 5.4. The NPPF also requires minerals planning authorities to "indicate any areas where coal extraction and the disposal of colliery spoil may be acceptable" and

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<sup>24</sup> Ministry of Housing, Communities and Local Government (2018) *National Planning Policy Framework*, paragraph 205.

<sup>25</sup> Ministry of Housing, Communities and Local Government (2018) *National Planning Policy Framework*, paragraph 204(a).

<sup>26</sup> Ministry of Housing, Communities and Local Government (2018) *National Planning Policy Framework*, Annex 2: Glossary.

<sup>27</sup> Ministry of Housing, Communities and Local Government (2018) *National Planning Policy Framework*, paragraph 211.

"encourage the capture and use of methane from coal mines in active and abandoned coalfield areas".<sup>28</sup>

- 5.5. The Planning Practice Guidance (PPG) states that the environmental impacts of coal extraction "should be considered in the same way as for other minerals" but notes that "[...] coal operators and mineral planning authorities must have regard to the environmental duty placed on them under section 53 of the Coal Industry Act 1994 when preparing and determining planning applications".<sup>29</sup> The PPG also sets out specific issues that mineral planning authorities should consider for underground mining.

### Restoration and aftercare of mineral sites

- 5.6. Before a site is worked, a restoration plan must be prepared. It must take into consideration soil resource (surface coal workings involve the removal and storage of large amounts of soil and overburden to access the coal) and site hydrology. Responsibility for the restoration and aftercare of mineral sites lies with the operator.

### **WYRE FOREST CORE STRATEGY**

- 5.7. The adopted Wyre Forest Core Strategy does not mention minerals in general or coal in particular.

## **6. PLANNING ISSUES ARISING FROM COAL MINING**

- 6.1. The emerging Minerals Local Plan will need to include a policy framework to ensure that the environmental, amenity and other impacts from coal mining operations are acceptable. Potential impacts are considered below.

### **TRAFFIC**

- 6.2. The extraction of coal and its transport off site are likely to cause large amounts of traffic. This will be most acute on the roads near the sites, as large lorries may be arriving and departing from sites regularly. Such impacts can be controlled and applications would typically need to include a transport statement or transport assessment. Traffic would also be created by employees working at the site.
- 6.3. Traffic noise can be reduced by screening, and traffic visibility by trees, although any landscape and visual impacts arising from such screening would need to be acceptable. Where possible it is preferable to transport coal by means other than road. Alternatives such as rail, private haulage roads or canal should be considered.

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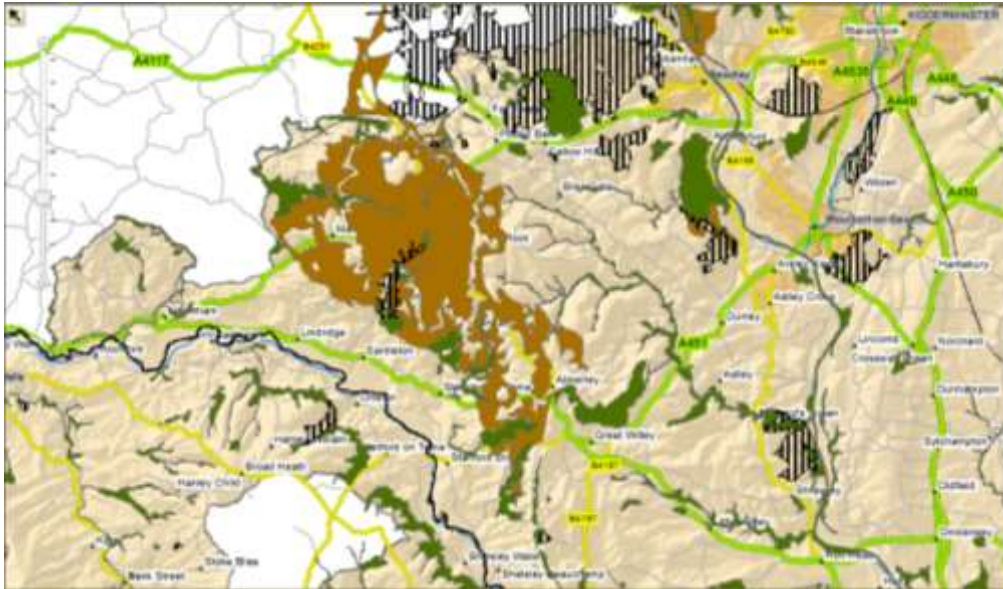
<sup>28</sup> Ministry of Housing, Communities and Local Government (2018) *National Planning Policy Framework*, paragraph 209.

<sup>29</sup> Ministry of Housing, Communities and Local Government, *Planning Practice Guidance: Planning for coal extraction* [online] Paragraph 147 Reference ID: 27-147-20140306 and Paragraph 148 Reference ID: 27-148-20140306, both revised 06 03 2014.

## DESIGNATED SITES

- 6.4. Coalfield locations in the Wyre Forest coalfield overlap with some SSSI sites. Although coal mines can be restored, it may not be possible to restore them to the same type or standard of landscape that existed before the minerals extraction took place. Surface and groundwater, land drainage systems and the water table in adjoining land may also be affected. All of these can affect the nature conservation value of the area.

**Figure 5. Map showing the area of Wyre Forest. The green areas are Local Wildlife Sites. The striped areas show SSSIs. Both of these occur in the coalfields, which are shown on the map in brown.**



- 6.5. The Wyre Forest SSSI is 1,755 Ha in size and covers a large amount of the Wyre Forest Coalfield found in Worcestershire.
- 6.6. There are also Local Wildlife Sites within and adjoining the Wyre Forest coalfield. The area is particularly noted for the extent and quality of its broad-leaved woodland. This is difficult to restore once mining operations have finished. However, where the need for development outweighs the harm to nature conservation interests, sympathetic restoration or alternative habitat restoration may be appropriate.
- 6.7. Coal working also has the potential to uncover geological features of scientific and aesthetic value, which may themselves warrant designation as Local Geological Sites or geological SSSIs.

## FIRECLAY

- 6.8. Fireclay is often found in association with coal deposits and is considered a premium clay, primarily valued for "[...] the production of buff-coloured facing bricks and pavers [...] Bricks made from fireclay also exhibit superior technical properties, such as strength and durability (frost resistance), which is a function of their mineralogy and, specifically, the presence of the clay

materials, kaolinite and illite."<sup>30</sup> It can also be used in the production of ceramics. There is no evidence that fireclay is found in Worcestershire.

## POTENTIAL EMISSIONS AND IMPACTS FROM COAL WORKING

- 6.9. A range of emissions and impacts are possible from coal working. All could be controlled by conditions, Coal Authority or Environment Agency licences, or legal agreements. The Environment Agency is the principal authority in terms of pollution control and health protection, but the County Council must also take these matters into consideration in any permissions granted.

## DUST

- 6.10. Dust can be created during coal extraction and during the transportation of material around and off the site. The NPPF requires that any unavoidable noise, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source<sup>31</sup>.
- 6.11. Concerns about dust generally fall into two categories: nuisance effects and health effects. There is also the possibility of negative impacts on the wider environment, including heritage, ecology, agriculture and designated nature conservation sites.
- 6.12. Good site management can help reduce the impacts of dust at the source.
- 6.13. Special care must be taken to ensure that facilities that are sensitive to dust are not unduly impacted by coal workings. Dust impacts arising from extraction can be mitigated through the following means<sup>32</sup>:
- Restrict dust making activities to selected areas
    - Soil handling and storage control and mitigation measures could be to restrict the duration of soil handling and storage activity and protect surfaces from wind until sealed
  - Control overburden storage by protecting material from wind and spray and maintaining surface moisture
  - Mineral processing control and mitigation through maximising levels of enclosure, and using air filters and water sprays
  - Material storage control and mitigation measures could be to dampen material, protect it from the wind, and store it undercover
  - Screen material to extract dusty fractions before external storage
  - Transport within the site control and mitigation measures could be to restrict vehicle speeds, water unsurfaced roads, wash wheels and vehicle bodies at appropriate distances from entrances, sheet or cover loaded vehicles,

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<sup>30</sup> BGS (2006) Minerals Planning Factsheet: Fireclay

<sup>31</sup> Ministry of Housing, Communities and Local Government (2018) *National Planning Policy Framework*, paragraph 205(c).

<sup>32</sup> Arup Environmental/Ove Arup & Partners (1995) *The Environmental Effects of Dust from Surface Mineral Workings*. Report on behalf of the Department of the Environment.

protect loading/unloading areas from the wind, minimise drop heights, sweep paved roads, and use conveyers rather than haul roads if possible.

- Using dust filters on equipment where possible
- Restricting dust-creating activities to certain times or locations

## NOISE

6.14. Noise can be created during coal extraction and during the transportation of material around and off the site. The NPPF states that planning policies and decisions should "mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life"<sup>33</sup>.

6.15. Noise issues are likely to arise from mining operations. Issues to do with noise can be lessened by several methods:

- Setting noise limits at sensitive properties
- Limiting hours of operation
- Planning the sequence of work to minimise noise impacts
- Avoiding work at night
- Taking special care with reversing alarms
- Minimising drop heights from lorries of plant machines
- Using rubber linings in chutes, dumpers, trucks, transfer points
- Switching off machinery when not in use.

6.16. Generally noise from deep mining is not considered a cause of major complaint. Often the loudest part of the development will be the construction of the new mine.

6.17. Surface mining has its own specific noise complaints arising from the use of blasting. There are three main effects of blasting, each of which can be minimised by several methods:

- Ground vibrations: minimise the use of maximum instantaneous charges
- Air blast wave: avoid the use of surface detonating cord when possible
- Rock fragments: careful design; moving fragmenting rock horizontally not vertically; using catch nets.

6.18. In both deep and surface mining operations the use of conveyors and traffic movements can also generate noise nuisances.

## VISUAL IMPACTS

6.19. Both surface and deep mines can have visual impacts. The impact on the visual environment depends on several factors including:

- Topography of the area
- Proximity to main transport links or residential properties

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<sup>33</sup> Ministry of Housing, Communities and Local Government (2018) National Planning Policy Framework, paragraph 180(a).

- 6.20. There are several elements to the visual intrusion of a mine, including development of the site prior to coal extraction, creation of soil and overburden mounds, and the presence of heavy machinery during extraction.
- 6.21. Deep mines and surface mines will have different visual impacts. The main visual impacts concerning deep mines include<sup>34</sup>:
- Surface development
  - Coal stocking
  - On-site tipping areas including lagoons
- 6.22. Tree planting may help mitigate the visual effects of deep mining but plants will take a long time to mature. Tree planting can be a permanent feature in the landscape and may remain long after the mining activity has ceased. This is an important consideration when using this method of mitigation where the landscape character does not include woodland or belts of trees.
- 6.23. Surface mining has its own visual impacts. Surface mining requires the removal of top soil and overburden, which is usually stored in mounds. This can prove a visual impact but can also be used as a visual barrier to the site.<sup>35</sup> In some cases views of the mine may be preferable to an intrusive mound.

#### LANDSCAPE IMPACTS

- 6.24. Landscape character around the Wyre Forest coalfield is a mixture of Principal Timbered Farmlands and Principal Wooded Hills.<sup>36</sup> Restoration of surface coal mining may still leave a scar on local topography, especially if it is hillside, but it may be possible to use colliery spoil deposits in landscaping schemes where appropriate<sup>37</sup>.
- 6.25. Mounds created at the edge of mining sites must have regard to local landscape and the height of spoil disposal sites should be limited to better blend in with local topography.
- 6.26. When final restoration is completed, final contours should be appropriate for the topography of the area and the local landscape. This includes the provision of hedges, walls and the planting of small copses and woodland where these are characteristic of the area.

#### TIP SLOPE STABILITY

- 6.27. There are several factors that can lead to instability in tip slopes. Mineral processing can create the potential for unstable slopes, because the waste

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<sup>34</sup> Office of the Deputy Prime Minister (1999) *Mineral Planning Guidance 3: Coal mining and colliery spoil disposal* [since replaced by the NPPF].

<sup>35</sup> Office of the Deputy Prime Minister (1999) *Mineral Planning Guidance 3: Coal mining and colliery spoil disposal* [since replaced by the NPPF].

<sup>36</sup> Worcestershire County Council Landscape Character Assessment, available at

[http://www.worcestershire.gov.uk/info/20014/planning/1006/landscape\\_character\\_assessment](http://www.worcestershire.gov.uk/info/20014/planning/1006/landscape_character_assessment).

<sup>37</sup> Office of the Deputy Prime Minister (1999) *Mineral Planning Guidance 3: Coal mining and colliery spoil disposal* [since replaced by the NPPF].



materials produced may be finer-grained than the original surface materials and may have higher water content.<sup>38</sup>

- 6.28. Factors affecting the stability of tip slopes include:
- Properties of the material in the tip, e.g. size, moisture content
  - Method of construction of the tip
  - Surface and ground water conditions
  - Foundation of tip
  - Operational factors such as vibration arising from mining activity.
- 6.29. To make sure tips are of sufficient quality, several factors must be tested including<sup>39</sup>:
- Existing mine features such as topography (making sure it is not contoured at greater intervals than 2m)
  - Examination of the superficial geology
  - Ensuring geological bedrock is a suitable foundation.

## SUBSIDENCE

- 6.30. Modern mining techniques can cause surface subsidence that may lead to structural damage. Methods available to minimise surface damage include:
- Partial extraction – using pillars for support, and variation in the geometry of the working panels
  - Preventative action to surface structures
- 6.31. The Coal Authority can restrict coal mining operations or refuse to grant a licence in order to limit the damage done by subsidence.
- 6.32. Historic workings have created a legacy of mining hazards in and around the coalfields in Worcestershire. It is possible that these hazards could be exacerbated by future workings.

## GEOLOGICAL CONSERVATION

- 6.33. The NPPF sets out that geological conservation should be considered in planning applications. Often mining will expose areas of geological interest that can then be incorporated in the restoration of the site.<sup>40</sup>
- 6.34. Geological interests may require rock faces to be preserved. This does, however, pose a risk of rock face falls, so it may be better to preserve small sections of face that cover a whole succession<sup>41</sup>.

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<sup>38</sup> Office of the Deputy Prime Minister (2000) *Minerals Planning Guidance 5: Stability in surface mineral workings and tips* [since replaced by the NPPF].

<sup>39</sup> Department of the Environment, Transport and the Regions (January 2000) *Minerals Planning Guidance 5: Stability in surface mineral workings and tips* [since replaced by the NPPF].

<sup>40</sup> Department of the Environment (November 1996) *Mineral Planning Guidance 7: Reclamation of mineral workings* [since replaced by the NPPF].

<sup>41</sup> Department of the Environment (November 1996) *Mineral Planning Guidance 7: Reclamation of mineral workings* [since replaced by the NPPF].

## HYDROLOGY

- 6.35. The main source of water from mine workings is the water that has to be pumped out to keep the mine dry. Potential pollutants include suspended soils and acidic drainage from minerals in waste rocks e.g. Pyrites. Water run-off from colliery spoil heaps is another potential source of pollution. Water issues can also arise after workings have been completed, from abandoned mine overflows into surface or groundwaters. Monitoring of ground water levels and the quantity and quality of recharge flows will be important.
- 6.36. To minimise the risk of hydrological effects, several methods can be employed<sup>42</sup>:
- Consider not dewatering, or dewater only in cells
  - Leave filter layers between aquifers
  - Create impervious bases to oil/chemical stores and wet process plant
  - Provide bunding to keep surface water out of workings
  - When creating lagoons, ensure they are of a sufficient size to cope with storm events.

## RESTORATION

- 6.37. Government policy is to provide for restoration and aftercare at the earliest opportunity, to be carried out to high environmental standards<sup>43</sup>.
- 6.38. There are several different uses for land once it has been restored, including:
- Agriculture – Most mineral workings take place on land that is used for agriculture prior to extraction. Where working is proposed on the best and most versatile agricultural land the outline strategy should show, where practicable, how the methods used in the restoration and aftercare enable the land to retain its longer term capability, though the proposed after-use need not always be for agriculture<sup>44</sup>.
  - Forestry – After mineral workings have been completed the area can be returned to forestry.
  - Amenity – including nature conservation and recreation uses such as "open grassland, country parks, informal recreational areas, conservation of landscape, natural features and wildlife, basic preparations for more formal sports facilities, amenity woodland, and water areas"<sup>45</sup>. Many of these uses can be incorporated onto one site.

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<sup>42</sup> Office of the Deputy Prime Minister (1999) *Mineral Planning Guidance 3: Coal mining and colliery spoil disposal* [since replaced by the NPPF].

<sup>43</sup> Ministry of Housing, Communities and Local Government (2018) *National Planning Policy Framework*, paragraph 205(e).

<sup>44</sup> Ministry of Housing, Communities and Local Government, *Planning Practice Guidance: How much detail on restoration and aftercare should be provided with the planning application?* [online] Paragraph 040 Reference ID: 27-040-20140306 Revision date: 06 03 2014.

<sup>45</sup> Department of the Environment (November 1996) *Mineral Planning Guidance 7: Reclamation of mineral workings* [since replaced by the NPPF].

- 6.39. Where possible, mine reclamation should be 'progressive', so as other areas are mined, old workings are restored.<sup>46</sup> This may limit the restoration that can take place. Open cast coal mining can create fine- to course-texture sediment, which can cause winter water logging or summer drought. Tree planting and survival may not be easy on some restored surfaces. The most successful types of species for forestry reclamation on surface working sites include: Japanese larch, Alder, Corsican pine, Scots Pine, Birch and Willow<sup>47</sup>.
- 6.40. Where the restoration is based on colliery spoil associated with deep mining, Alders, Birch, Hawthorn, Ash, and Scots pine are recommended. Where native species fail to thrive, Lodgepole pine, Corsican pine, and False acacia have also grown successfully on restored workings in the UK. In all cases, restoration schemes should be informed by green infrastructure principles and should reflect the most appropriate choices for their location.
- 6.41. Because of the large amount of overburden that is removed in surface coal mining it is often possible to return sites to levels close to their original surface level. Where surface coal mining is associated with heavy soils, it is often necessary to install drainage systems.

## 7. CONCLUSIONS

- 7.1. If coal mining were to begin again, one of the main issues is likely to be the impacts of traffic from the site. The last two applications for planning permission for coal working in the county were rejected on grounds that included the increased traffic to and from the site, and the detrimental effect this would have on the local road network. On the basis of previous applications and the BGS mineral report, the most likely areas to be worked are likely to be near SSSIs, Local Wildlife Sites, and in areas of high landscape value. The effects of coal mining in Worcestershire on the environment are likely to be significant. More positively, however, the restoration of sites after coal mining has finished has improved dramatically since coal was last worked in Worcestershire.
- 7.2. In practice, although there are coal resources in Worcestershire, these are limited to a small part of the county, representing small sections of larger coalfields that cross the county's borders. There have been no applications for coal mining in the county in the last 20 years, and no applications for a surface mine in over 25. The BGS *Herefordshire and Worcestershire Resources and Constraints report*<sup>48</sup> on minerals in the county states that it is unlikely the coalfields would attract any surface working interest in the near future. The advice of the Coal Authority and CoalPro is that they have no interest in working coalfields in Worcestershire. The council considers it unlikely that coal mining will be commercially viable or attract any commercial interest in the

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<sup>46</sup> Department of the Environment (November 1996) *Mineral Planning Guidance 7: Reclamation of mineral workings* [since replaced by the NPPF].

<sup>47</sup> Department of the Environment (November 1996) *Mineral Planning Guidance 7: Reclamation of mineral workings* [since replaced by the NPPF].

<sup>48</sup> BGS (1999) *Mineral Resource Information for Development Plans Herefordshire and Worcestershire: Resources and Constraints*.

lifetime of the Minerals Local Plan. The Council therefore does not intend to safeguard coal resources in the county. It will, however, ensure that policies are included in the Plan to take appropriate account of mining hazards notified by the Coal Authority.