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TATA STEEL UK LTD

P FIELDS, PORT TALBOT

COAL MINING RISK ASSESSMENT

AUGUST 2024

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Wardell Armstrong
Sir Henry Doulton House, Forge Lane, Etruria, Stoke-on-Trent, ST1 5BD, United Kingdom
Telephone: +44 (0)1782 276 700 www.wardell-armstrong.com

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AUGUST 2024

PREPARED BY:

A J Clarke Engineering Technician

REVIEWED AND APPROVED BY:

C Smith Technical Director

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ST20879-002	P Fields Coal Mining Risk Assessment	1:2,000

APPENDICES

Appendix 1 Coal Authority Consultant Mining Report ref 51003442000001, dated 5 August 2024

Appendix 2 Coal Authority Mine Entry Datasheets ref 71008090808001, dated 18 August 2021

Appendix 3 Ordnance Survey historical topographic mapping, provided by Landmark Information Group

1 INTRODUCTION

1.1 This report has been prepared in accordance with instructions received from Tata Steel UK Ltd (TSUK) in accordance with our proposal dated 2 August 2024.

1.2 This report conveys the findings of a desk-based Coal Mining Risk Assessment (CMRA), undertaken to identify potential coal mining related constraints to the "P Fields" development area at the Tata Steel site in Port Talbot. The report is intended to inform the development proposals and to consider potential remediation options. The Site is partly within a Coal Authority (CA) designated Development High Risk Area and therefore this Coal Mining Risk Assessment is prepared to support a forthcoming planning application.

Site Location and Description

1.3 The P Fields area is part of the wider decarbonisation project at Tata Steel steelworks in Port Talbot, South Wales. The P Fields Site Boundary is that on drawing ST20879-002 dated 5 August 2024. For the purposes of this Coal Mining Risk Assessment, the P Fields Site Boundary is referred to as "the Site".

Proposed Development

1.4 The development is understood to comprise the installation and retention of concrete hardstanding for industrial use associated with the continued operations of the steelworks, and landscaping, green infrastructure and drainage works. The slab is to be constructed generally at existing levels, replacing a pre-existing yard comprised of gravel hardstanding. A pumping station will be installed in the southern extent of the Site, which is the only significant structure included in this development. The design of the pumping station is understood to incorporate a 4m diameter, 6m deep cylindrical pumping chamber. This chamber is likely to be constructed of precast concrete segmental rings sat upon a concrete pad.

Sources of Information Used to Inform this Report

1.5 The following sources of information have been used in compiling this report:

- Coal Authority Consultants Mining Report Ref 51003442000001 (Appendix 1).
- Coal Authority Mine Entry Data Sheets (Appendix 2).
- Abandoned Mine Plans obtained from The Coal Authority.
- Published British Geological Survey (BGS) 1:10,560 Mapping, Sheet SS78NE.

- Published Historical Ordnance Survey (OS) topographical mapping provided by Landmark Information Group (Appendix 3).
- BGS and CA Datasets available under the Open Government Licence v3.0.
- Online resources of The Mining Institute from mininginstitute.org.uk.
- Online resources of Northern Mine Research Society from www.nmrs.org.uk.
- Wardell Armstrong LLP archive records and Technical Notes.
- Previous Wardell Armstrong LLP site visit records and ground investigations.
- Previous RSK ground investigations.
- TATA Steel UK archive records.

2 IDENTIFICATION AND ASSESSMENT OF SITE-SPECIFIC MINING RISK

Background

2.1 The Site is an area within the wider steelworks operations, which have been in place since the 1950s, initially known as the Abbey Works and then as the Grange Coke Ovens, before partial redevelopment in recent years. The southernmost extent of the steelworks land consists of undeveloped land with irrigation ditches which has been largely remained undeveloped throughout recent history. Prior to the steelworks, the Site was partly occupied by Morfa Colliery, which was already in operation at the date of the first published mapping of 1876. The colliery is indicated to have closed in c.1913 and is recorded to have been demolished prior to 1940. At least two mine entries are identified from Ordnance Survey topographic mapping as being associated with the colliery – Grange Pit and Abbot Pit.

Geology

2.2 The geology of the Site has been assessed by review of published geological mapping; publicly available borehole records; and two recent phases of ground investigation undertaken by RSK. The published British Geological Survey (BGS) 1:10,560 geological mapping (Sheet SS78NE), and 1:50,000 mapping (Sheet 247) has also been obtained and which covers the Site. The geological mapping identifies that South Wales Middle Coal Measures and Lower Coal Measures strata are present at the Site, comprised of “grey coal-bearing mudstones and siltstones with seat-earths and thin sandstone beds”. Several coal seams are expected to be present, subcropping within the Site.

2.3 A summary of the relevant geological data for the site is presented in Table 2.1 below.

Table 2.1
Summary of Relevant Geological Data

Strata	Description
Made Ground	The site is recorded to be underlain by Made Ground. This is categorised as "landscaped ground", which the BGS defines as "where the land surface has been artificially remodelled, but where it is impracticable or impossible to delineate separate zones of Made Ground, worked ground or disturbed ground and is of variable composition". Based on the current and past land uses of the Site it is anticipated that variable and locally significant thicknesses of Made Ground will be present. Contemporary site investigation undertaken by RSK, and historical borehole records held by the BGS, record the presence of Made Ground across the Site to varying thickness with depths between 0.91m and 6m. The Made Ground encountered is reported to generally comprise gravels, sands and silts of slag, clinker and brick.
Natural Superficial Deposits	The Superficial Deposits mainly comprise Tidal Flat Deposits (clay, silt and sand) across much of the eastern half of the Site and blown sand deposits across the western part of the Site. The far western edge of the Site comprises sands and gravels of Marine Beach Deposits and Storm Beach Deposits. The RSK investigation encountered sand, clays, gravels and peat deposits. The thickness of Superficial Deposits encountered during the investigation varied between 18.1m up to 31.8m in depth. Peat is also recorded across the Site and was encountered in many of the boreholes at depths of between 4.5m and 18.6m below ground level. The peat is reported to be pseudo-fibrous and clayey and sometimes a secondary constituent to the clay deposits.
Solid strata	The Site is underlain by the South Wales Middle and Lower Coal Measures Formation comprising coal seams, mudstone, siltstone and sandstone. By review of the BGS Geological Mapping (Sheet SS78NE) a number of coal seams are inferred to subcrop within the boundaries of the Site. These coal seams are also indicated on the plan accompanying the CA mining report (Appendix 1). The seams recorded to subcrop at the Site are the Upper Nine Foot, Lower Nine Foot, and Lower 9FT and Bute; while the BGS mapping indicates the Upper Nine Feet (U 9 FT), Lower Nine Feet (L 9 FT), Bute, and Amman Rider are thought to subcrop at the site. The Yard seam is anticipated to subcrop to the south west of the Site boundary, but dips towards the north, and may therefore be present beneath the Site at shallow influencing depth. The approximate locations of the coal seam subcrops are shown on Drawing ST20879-002 for reference. Historical borehole records and the recent RSK investigation have identified that the depth to rockhead is variable across the Site, identified at depths from 15m to 32m below ground level.

Summary of Coal Mining Records

2.4 The CA mining report (Appendix 1) identifies a number of key mining related features and hazards relevant to the Site. Only those within the Site area are reported below.

- *Past Underground Coal Mining*

  The Coal Authority records that underground coal mine working has historically taken place beneath the site in two seams at depths from 138m to 206m, the last date of working being 1911. These workings are recorded to be within the Five Foot and Gellideg coal seams. These mine workings may give rise to:
  - ground subsidence; and
  - ground instability, loss of ground, generation of crown holes.

- *Future Underground Coal Mining*

  The Coal Authority reports that whilst the property is not in an area under licence or under consideration of licencing for underground coal mining activity, reserves are available which could be worked in the future. Whilst is it considered very unlikely that this coal would be worked in the foreseeable future, any such working may give rise to:
  - ground subsidence; and
  - ground instability, loss of ground, generation of crown holes.

- *Mine Gases*

  The Coal Authority reports that there have been no recorded instances of mine gas at or within 500m of the property boundary. However, online archive sources have described that several mine gas related incidents have taken place – relating to explosions within the mine workings at the formerly active Morfa Colliery at the site. Disturbing coal or coal mining features, during construction or investigation, has the potential to generate or displace underground gases. Accumulation of mine gases may give rise to:
  - depleted oxygen environments, causing asphyxiation; and
  - potentially combustible/explosive concentrations of air.

- *Geological Faulting*

  No geological faulting is reported by either the British Geological Survey or Coal Authority within the Site boundary. However, several faults are recorded within

the wider Planning Boundary by the BGS. Geological faults present a plane of weakness in the rock, which typically manifests as a zone of fractured or brecciated strata and may result in localised fold structures. Whilst not considered likely to cause significant ongoing damage to the surface, faulted ground can contribute to the scale of surface subsidence damage resulting from underground mining and mining related movements. With particular reference to where mine workings are in close proximity to the plane of a geological fault, they may give rise to:

- excessive or erratic ground subsidence;
- ground instability, loss of ground, generation of crown holes; and
- mine gas emissions.

- *Mine Entries*

  The Coal Authority reports the presence of mine entry 277186-001 approximately 16 metres outside the northern boundary of the Site and mine entry 277186-002 approximately 90m to the south of the Site. One further shaft is recorded within the wider TATA Site Planning Boundary, albeit at significant distance from the Site. Where present within influencing distance to the built development, the particular risks to development are:
  - catastrophic collapse of the mine entry leading to ground instability or voids at the ground surface;
  - settlement of the ground surface above/adjacent to the mine entry; and
  - mine gas emissions.

2.5 Mine Entry Datasheets have also been obtained from the Coal Authority to provide further information with respect to the reported mine entries (presented at Appendix 2 for reference). The information reported by the Coal Authority does not include the findings of a 2021 physical investigation undertaken by Wardell Armstrong to locate the mine entries.

2.6 Mine Shaft 277186-001 (Grange Pit) is reported to be present on Ordnance Survey 1:2,500 scale mapping, and is verified to be shown on the mapping obtained from Landmark Information Group, provided at Appendix 3. The Grange Pit is also reported by the CA to be present on Mine Abandonment Plan parcels 3654 and 5851A, which both confirm the identity and approximate position of the mine shaft.

The BGS 1:10,000 geological sheet (SS78NE) has also been obtained for the Site, which also confirms the identity and approximate position of the shaft. The CA identify an additional source plan record for the Grange Pit as being the "Tonddu Roll 88"; however, the CA do not hold a copy of this record and it has therefore not been possible to verify. The Grange Pit is recorded by the CA to be 367.6m deep and has been infilled to an unknown specification.

2.7 Mine shaft 277186-002 (Abbot Upcast Pit) is reported by the CA to be present on Ordnance Survey 1:2,500 scale mapping (Editions 1870, 1900 and 1920) which has been verified by reference to the mapping obtained from Landmark (Appendix 3). The CA also report that the mine entry is recorded on Mine Abandonment Plan parcels 3654 and 5851A. By inspection of mine plan 5851A, we are able to confirm that the Abbot Pit is shown. However, inspection of plan 3654 does not include this mine shaft, as indicated by the CA. The Abbot Pit is also shown on the published geological mapping (sheet SS78NE). The CA also identifies the "Tonddu Roll 88" as a source record for this mine entry, however as the CA do not hold a copy it is not possible to verify this record. The CA report that the Abbot Pit is 170.7m deep and has been infilled to an unknown specification.

3 COAL MINING RISK ASSESSMENT

3.1 The potential coal mining legacy risks to the future development, are discussed in detail below and are summarised in Table 3.1.

Mine Workings Risk

3.2 The CA Mining Report (Appendix 1) refers to the presence of recorded mine workings in the Five Foot and Gellideg seams beneath the Site, at depths ranging from 138m to 206m, with the last date of working in 1911. The CA Mining Report also records the maximum extraction thickness of this seam to be 3.3m in the Five Foot seam.

3.3 The coal seams generally subcrop in a west to east orientation through the Site. Correlation of BGS and CA records suggest that that the Upper Nine Feet, Lower Nine Feet, Bute and Amman Rider seams are at subcrop beneath the Site, with the Yard seam subcropping to the south of the Site. The approximate positions of the

subcrops and mine entries have been transposed onto Drawing ST20879-002 for ease of reference.

3.4 The coal seams are recorded to dip in a northward direction and as such the area considered to be at risk from any shallow workings associated with each of these seams is located to the north of the subcrop position. The dip of the strata is recorded to vary significantly between a <1° and maximum of c.30° from the horizontal. The dip of the strata may be influenced by the presence of geological faulting, including thrust faults, which are conjectured to be present beneath the wider TATA Site Planning Boundary area.

3.5 It is considered that a number of the shallow coal seams which subcrop beneath the Site are of a potentially economic workable thickness. Whilst there are no records of working within these seams directly beneath the at the site, it is possible that these seams may have been worked at some point in the past, notably the Lower Nine Foot Top Leaf is recorded to have been worked elsewhere beneath the steelworks. While the workings are recorded at a depth of no shallower than 138m below the ground, nearby seams have been worked to a depth of 63m; and while the last date of workings in the Five Foot is recorded as 1911, the workings of nearby seams are not recorded to have ceased until 1913. It is considered feasible that the Lower Nine Feet seam, in particular, may have been worked to a shallower depth and more recently than the recorded abandoned mine workings would indicate.

3.6 The CA Mining Report does not refer to the presence of recorded abandoned coal mine workings at shallow depth, nor does it refer to the potential for coal to be present at typical shallow depth that could have been worked in the past (unrecorded mine workings). However, it is considered that the basic assessment of shallow risk (based on a depth of <30m below ground level) is insufficient in this case, due to the presence of deep Superficial / Made Ground Deposits (up to c.32m as reported within BH2 of the previous RSK site investigation). As such any coal present immediately beneath the Superficial / Made Ground deposits geology may still pose a risk of mining related ground instability.

3.7 The risk of surface instability arising from abandoned mine workings is generally regarded to be a function of the thickness of intact rock cover above the roof of a mine working, and the extraction thickness of the mine working. Published industry

guidance (CIRIA C758) refers to typical treatment depths of up to 60m, but that exceptionally, workings at depths up to 150m can result in damaging ground movements at the surface.

3.8 The formation of "crown hole" collapses (voiding caused by the upward migration of a mining cavity) is the more common surface hazard caused by mining. Such collapses typically affect a relatively small area at the surface above a mine working and their occurrence is rare where mine workings are present at depths in excess of 70m. Surface movement arising from the collapse of deeper mine workings is more likely to be associated with areal collapse mechanisms, which are less common than crown hole type collapses, but may affect a much larger area at the surface.

3.9 The most recent recorded mining activity beneath the Site is reported to have been undertaken in 1911. Substantive ground movements associated with deep underground mining activities is typically experienced within a few years of the mining event, and as such the risk of substantive ground movement arising from deep mine workings would be expected to have ceased by now. The recovery of minewater within abandoned workings (which would have been subjected to control and pumping during mining activities) can give rise to further ground movements. However, in cognisance of the significant time that has elapsed since the last recorded mining at and in the vicinity of the Site, it is likely that minewater recovery will have been substantively complete by now, such that there is no expectation of significant ongoing movement as a result.

3.10 It is considered that, in the absence of a significant risk of ongoing substantive movement from the deep mine workings, it would not be necessary to implement mitigation measures for new surface developments.

3.11 The calculation of crown hole collapse risk posed by underground mine workings is based on the thickness of competent rock strata above the seam. Industry experience (as reported by Piggot & Eynon, 1977) suggests that collapse migration above old room and pillar workings is typically in the range of three to five times the working height (extraction thickness) although such collapse might, in exceptional circumstances, extend to a distance equivalent to ten times the worked height. As such the "10T" rule for rock cover thickness is considered an initial base-line criteria for assessment of mine working collapse migration risk.

3.12 Additionally, it is a generally accepted practice that particularly thick, and well consolidated Superficial Deposits can also contribute to stability at the surface where there is otherwise insufficient intact rock cover above a mine working, again this practice is referred to in industry guidance (CIRIA C758).

3.13 From the BGS published geology, alongside a limited intrusive investigation at the Site, it is understood that the Superficial Deposits comprise mainly a mix of soft cohesive and granular deposits. Granular deposits, in particular, are unlikely to offer the capacity for sufficient bulking or arching/spanning that would be necessary to arrest the migration of voids from any underlying collapsing mine workings. Rather, it could be anticipated that a granular soil would tend to 'flow' into a collapse, and result in the translation of a void to the surface in the form of an area of localised subsidence.

3.14 The "10T" rule of thumb would suggest that the mine workings with the greatest extraction thickness of 3.3m, have the potential to give rise to the risk of crown hole collapse migration to the surface until at least 33m of competent rock cover is present above the workings. In consideration of the maximum thickness of Superficial / Made Ground Deposits proven at the Site (c.32m), a possible worst case crown hole collapse may migrate a total distance of 65m to the surface.

3.15 As the recorded workings are at depths of not less than 138m within the Five Feet seam, there is no risk of crown hole collapse from recorded workings. However, with a known worked seam, recording to subcrop at the site, the risk of crown hole collapse from unrecorded workings cannot be discounted.

3.16 Both the CA and the BGS geological mapping record the presence of faulting of the geological strata within the wider TATA Steel steelworks area, but none within the Site boundary. Specific risks posed by faulting are considered to be negligible in respect of the proposed development.

3.17 In consideration of the complex geological structure at the Site, it is recommended that a confirmatory intrusive investigation is undertaken targeted to the footprint of proposed new (sensitive) built development footprints. It is understood that a multi-purpose geoenvironmental site investigation is underway at the time of writing; with

several boreholes designed specifically for furthering the understanding of coal mining risk. The scope of targeted investigation is understood to comprise a combination of both cored and open hole rotary boreholes and which extend to depths of up to 85m below ground level.

Mine Entry Risk

3.18 Whilst mine entry collapses are comparatively rare, they can result in substantial and immediate damage to the built environment and represent a risk to life and would be regarded to represent an unacceptable risk to the future development.

3.19 The potential area at risk from a mine entry collapse is assessed by reference to the nature of the near surface materials in the vicinity of the shaft. The anticipated depth to rockhead is recorded to be variable across the site, but is approximately 26m in the area of the mine entry 277186-001, and approximately 31m in the area of mine entry 277186-002.

3.20 In consideration of the geological setting at the site, the area at risk in the unlikely event of a mine shaft collapsing could, in a reasonable worst-case scenario, extend an equivalent distance beyond the actual position of the mine shaft (that is, applying an angle of repose of 45° for the Superficial Deposits and Made Ground, if present).

3.21 Following an original desk-based assessment of the mine entry risk, a phase of physical investigation to positively identify the mine entry has been undertaken. Mine Entry 277186-001, is recorded to be in the order of 367.6m in depth and its location has been confirmed by excavation. The shaft is described as a brick-lined irregular rectangle shaped shaft with curved sides with a 3.2m by 3.9m internal diameter. The shaft lining was observed to be of brick construction, c.0.5m in thickness. The shaft was found to be infilled with a black Made Ground which included boulders, metal rails and a timber beam.

3.22 While the shaft is outside the site, the zone of influence of a possible collapse event extends to within the site. This zone has been estimated at 29m from the shaft centre point, and is shown on Drawing ST20879-002.

3.23 In the case of mine entry 277186-002, a phase of excavation to locate the shaft was unsuccessful, and as such the precise position of it is unknown. We can assume that

the zone of influence surrounding this shaft can be the sum of the Coal Authority departure (5m), the assumed radius of the shaft (2m) and the approximated depth to rockhead in this area (31m). A total zone of influence around the CA reported shaft position of 38m. In this instance, the shaft is approximately 90m from the Site area, and therefore considered to pose no risk to the Site development.

3.24 The current proposals for the Site do not involve the construction of sensitive built development in close proximity to the reported shaft position. Whilst the potential zone of influence to shaft 277186-001 is indicated to encroach within the Site, it does not encroach upon the proposed footprint of the new slab construction. On this basis, and as the shaft position has been proven by investigation, it is considered that the risk posed by the recorded mine entries to the proposed concrete slab construction can be concluded to be low.

3.25 In addition to the above, there is also the potential for unrecorded mine entries to be present on and within influencing distance of the Site. As above, construction work should proceed cautiously, recognising the possibility for unstable mine entries could be present. Should any anomalous ground conditions be encountered during the development works then specialist advice should be sought.

Geological Faulting

3.26 Four geological faults are recorded nearby to the Site (Kenfig-Tytalwyn Thrust Fault, Newlands Thrust Fault, the Giants Grave Fault and the Morfa Fault). Geological faulting may create an uneven or stepped rockhead profile and may also result in a deeper weathering profile to the strata in the vicinity of the fault. Geological faults may also provide the opportunity for unorthodox ground movements due to the presence of mine workings, and faults in mining areas are known to be susceptible to reactivation by the mining activity.

3.27 None of the faults are recorded to be within the Site and as such there is negligible risk to the proposed development from fault reactivation.

Mine gases

3.28 The presence of coal measures geology and mine workings beneath the Site provide potential sources of Methane, Carbon Dioxide, Carbon Monoxide, Hydrogen Sulphide, Hydrogen and Radon gases, and it would be prudent to assume that such

gases could migrate to the surface.

3.29 The Swansea district geological memoir indicates a moderate susceptibility to the emission of methane and carbon dioxide and various historical online archives report the presence of firedamp (potentially explosive, methane rich air) which notably has resulted in explosions and considerable loss of life at the former Morfa Colliery.

3.30 The groundwater conditions at the site are considered likely to be tidally influenced and may be in hydraulic continuity with the mine workings. The tidal influence on mine water may give rise to the displacement and circulation of mine gases.

3.31 The presence of geological faulting and mine entries close to the Site provide potential pathways for the migration of mine gases. Furthermore, the Superficial Deposits present at the Site are recorded to incorporate granular soils, which may facilitate the migration of mine/ground gases into the Site from sources beyond the red-line boundary.

3.32 Any mine gases which may be present have the potential to accumulate in confined spaces, posing an explosive or asphyxiating risk. These risks may manifest during the construction phase in excavations or during operation of the structures. While it is understood that gas risks are already being assessed by an ongoing site investigation, no additional measures are thought necessary, where confined space entry is already undertaken by competent persons with appropriate risk assessment and control measures.

3.33 A summary of the findings of the Coal Mining Risk Assessment is presented in Table 3.1 below.

Table 3.1
Summary of Coal Mining Risk Assessment

Coal Mining Issue	Consequences	Mitigation	Residual/ Mitigated Risk
1. Past Underground Mining	Due to thick Superficial / Made Ground Deposits at the site (up to c.32m recorded by previous investigations) the typical depth consideration of 'shallow' mine workings (that being those mine workings present or potentially present within a depth of 30m from the surface), may not be appropriate in this case where there would be insufficient intact rock cover (or any rock cover) within this depth. Therefore, it is anticipated that the presence or potential presence of coal mine workings at a greater depth than 30m below the surface may pose a potential risk of ground instability to any surface development at this Site. Ground subsidence associated with underground coal mining can give rise to ground settlement, and cause: damage to the built environment that may affect both serviceability and design life of a structure; harm to human health; injury or death of site users; site employees; and maintenance operatives or construction workers using the site. The Coal Authority hold records of underground mining within the Five Feet and Gellideg coal seams beneath the site. The most recent workings reported by the CA are dated 1911. It is considered unlikely that there are any additional significantly more recent workings that are unrecorded, as it would be expected that more modern mining activities would have been captured by the legislative requirements to retain records of the mine workings. The shallowest record of mine workings relates to the Five Feet coal seam, at a depth of 138m, which is considered to be a depth where the thickness of intact rock cover above the working is sufficient to preclude the risk of crown hole collapses propagating to the surface. The possible presence of unrecorded shallow mine workings associated with other coal seams at the Site cannot be discounted. The Site is underlain by a total of five proven or inferred coal seams at potential shallow influencing depth, four of which subcrop directly beneath the Site and a fifth, the Yard, is likely to be present at influencing depth beneath the south of the Site.	The presence or potential presence of abandoned unstable mine workings at shallow influencing depth beneath the Site is considered to represent a risk of instability to future built development. However, the proposed development primarily comprises the construction of a large area of concrete hardstanding (slab). Such development would not create occupiable (enclosed) space or require extensive groundworks to construct. It would therefore likely fall within the scope of exempt developments, as documented within the Coal Authority "Exemptions List" such that the scope of the development would be expected to incur minimal engineering operations and would not otherwise require a Coal Authority Permit to complete. The construction of the proposed drainage pumping station and associated apparatus would also not be likely to intersect coal or be carried out within the zone of influence to any mine entry (so would also not be expected to require a Coal Authority Permit to complete). However, the proposed form of construction may be more sensitive to potential ground movements or ground loss. In consideration of the anticipated presence of coal seams within influencing depth of the surface at and close to the proposed location of the drainage pumping station, the risk of potential unrecorded shallow abandoned mine workings cannot be discounted. It is therefore appropriate to undertake a limited scheme of intrusive investigation to confirm the ground conditions (and presence or absence of coal seams at influencing depth) beneath the footprint of the proposed pumping station. An investigation is ongoing at the time of this CMRA being prepared. Whilst this investigation is designed and executed by others, it is understood that it comprises several cored and open-hole boreholes for the purpose of investigating the coal measures strata. It is recommended that further consideration of any possible mitigation requirements be given following conclusion of the ongoing investigation. The designer of the new drainage facility shall have regard to the	**Low**

Table 3.1
Summary of Coal Mining Risk Assessment

Coal Mining Issue	Consequences	Mitigation	Residual/ Mitigated Risk
		potential interaction with coal seams at influencing depth, and the above indictive investigation requirements should be reviewed to ensure that an appropriate depth of investigation (and treatment, if required) is afforded to the proposed development.	
2. Future Underground Coal Mining	Whilst coal reserves remain available in the area, it is unlikely that coal seams within this area will be worked in the foreseeable future. However, should the coal be worked, then there is the risk of ground subsidence, ground instability, loss of ground and the generation of crown holes.	No mitigation is required in the absence of a specific hazard. On the basis of professional judgment, it is deemed unlikely that coal seams will be worked at shallow depth within influencing distance of the site.	**Low**
3. Mine Entries	Ground subsidence associated with untreated mine entries may give rise to: • Sudden collapse leading to voids or instability at the ground surface. • Generation of mine entry related crown holes at the ground surface. • Possible mine gas emissions. The Coal Authority records the presence of one mine entry outside the Site. The CA do not report any investigation or treatment with the exception of the "filling" of shafts 277186-001 to an unknown specification. Mine entry 277186-001 has been visually identified at the Site during works undertaken by Wardell Armstrong in 2021. The shaft was observed to be brick-lined and infilled. Records indicate that the shaft extends to a depth of c.367.6m. A potential collapse zone of influence extends into the site boundary but does not interfere with the proposed concrete slab location. Mine entry 277186-002 is located approximately 90m from the Site and is not anticipated to present a risk to the stability of the proposed development. The potential also exists for unrecorded mine entries to be located beneath or within influencing distance of the site.	The current proposals for the site do not indicate sensitive built development in close proximity to (i.e. within the zone of influence of) any recorded mine entry. The risk of encountering unrecorded mine entries cannot be entirely discounted and construction works should proceed cautiously. Should unusual ground conditions be uncovered which may indicate the presence of a mine entry, specialist advice should be sought. In the absence of any significant anticipated risk to the stability of the proposed development, no mitigation measures in respect to mine entries are currently anticipated to be required.	**Low**

Table 3.1
Summary of Coal Mining Risk Assessment

Coal Mining Issue	Consequences	Mitigation	Residual/ Mitigated Risk
4. Geological Faults	Geological faults and mining induced weakness planes may provide the opportunity for unorthodox ground movements. The presence of faulting can create a stepped rockhead profile which may cause subsidence across faults, impacting settlement of proposed structures. Fault planes and other rock fractures may provide a pathway for possible mine gas migration.	The prospect of mining induced fault re-activation or significant differential movement across a geological fault is considered to be low, long after the cessation of mining activities. The presence of geological faults can give rise to highly variable ground conditions, and the remote possibility of fault reactivation should be considered by the structural engineer / geotechnical designer of any new built development. Consideration for possible mitigation measures will be made following conclusion of the ongoing investigation.	**Low**
5. Mine Gases	Mine gases have the potential to accumulate as an explosive or asphyxiating atmosphere, particularly in low lying and enclosed spaces. While the CA do not record any mine gas instances historical archive records local to the Site indicate the presence of firedamp (Methane rich air) at the mining horizon. Mine workings within Coal Measures strata beneath the site are associated with the emission of Methane, Carbon Monoxide, Carbon Dioxide, Hydrogen Sulphide, Hydrogen and Radon. Piled foundations, mine entries, geological faults, fractured and permeable strata will act as a pathway for possible mine gas (and mine water) migration. Tidally influenced groundwater/mine water conditions may persist at this Site and may enable more rapid circulation of mine gas through permeable deposits within the tidal range. The surface hardstanding / concrete slab is not sensitive to the risks of mine gas migration, however, the deep excavation and underground drainage chambers associated with the pumping station may provide opportunity for the accumulation of mine gases.	It would be recommended that a ground gas risk assessment and investigation is undertaken to assess the potential risks due to ground gases and mine gases at the Site, in relation to any potentially sensitive/occupiable spaces. The investigation should take the form of several boreholes drilling to the mine working horizon and with an installation screened off from the surrounding strata. Personal gas alarms for drilling crew and water drilling flush would be considered a minimum safety requirement. The scope of any ground gas investigation is presumed to have been agreed with the Local Authority. Construction works and any subsequent operational requirements, particularly where entry into confined spaces is required, should proceed with the appropriate risk management measures and due regard to the risk of gas accumulation within confined spaces. It is anticipated that standard confined spaces procedures would preclude the need for any additional mine gas related control measures in respect to the proposed development.	**Low/Moderate**

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 This desk-based assessment has identified the principal risks to the future development to be the presence of recorded mine entries and shallow mine workings; the potential for unrecorded abandoned, unstable mine entries and mine workings within influencing depth of the surface; the potential presence of geological faulting and the presence of mine gases.

Mine Entries

4.2 From the sources of information interrogated, two mine entries have been identified within close proximity of the Site, (Coal Authority reference 277186-001 and 277186-002). The position of Shaft 277186-001 has been positively identified as part of previous investigative works undertaken in 2021. The position of shaft 277186-002 is not proven and the CA report the shaft is likely to be located within a “departure” of 5m from the reported position. The zone of influence for collapse risk associated with this shaft is calculated as extending up to 38m from the coordinated position (based on the departure, shaft size and depth to rockhead). As the shaft is located approximately 90m from the Site area, it is considered to be located beyond the point at which it would be considered to pose a risk to the Site development.

4.3 The potential zone of influence of recorded mine shaft 277186-001 is indicated to encroach within the Site boundary but does not extend beneath the footprint of the proposed slab or drainage infrastructure. The current development proposals indicate that no sensitive built development is proposed above or within the potential zone of instability of either shaft 277186-001 or 277186-002.

4.4 There remains the possibility of the existence of unrecorded mine entries to be present within the Site. Vigilance should be maintained during any construction phase for signs of ground movement or Made Ground deposits, possibly associated with a mine entry. Any suspicious ground conditions should be reported for inspection and assessment by appropriately experienced person.

Mine Workings

4.5 In addition to the presence of recorded mine entries, a potential unstable mining setting is thought to be present within influencing depth beneath the Site. Mine workings are recorded beneath the Site at depths of 138m and 206m which, with a

variable thickness of Superficial geology (up to c.32m); and a recorded maximum seam extraction thickness of 3.3m, are considered to be beyond potential influencing depth of the future surface development. However, a series of coal seams are conjectured to subcrop beneath the Site and are anticipated to be present within influencing depth.

4.6 The future development (surface concrete hardstanding / slab) is not regarded to be particularly sensitive on the basis that it does not provide any occupiable space and could readily be remediated in the unlikely event of any ground movement due to the collapse of unrecorded shallow mine workings. However, in the event of any shallow mine workings collapse, it is anticipated that the proposed drainage pumping station and associated structures are likely to incur damage that may significantly affect their serviceability.

4.7 Therefore, a scheme of targeted intrusive investigation is recommended to confirm the presence and status of the shallow coal seams in respect to the position of the proposed drainage infrastructure. It is understood that an intrusive investigation is underway at the time of writing, which includes a programme of both cored and open rotary investigation boreholes up to 85m below existing ground level. This investigation will in part, confirm the presence of the coal seams beneath the Site and help to understand the extent to which they may have been worked at shallow depth.

4.8 An interpretation of the investigation data will be required to assess the subcrop position of each coal seam, the suitable thickness of intact solid strata beneath the future development and the extent of any risk posed by mine workings. Should any risk be identified, it would be considered prudent to seek to incorporate structural mitigations within the design of the new drainage infrastructure, or otherwise undertake appropriate mitigation measures such as the stabilisation of any shallow abandoned mine workings.

Geological Faults

4.9 In the absence of any ongoing or recent underground mining activity, the presence of any geological faulting at or in the vicinity of the Site is unlikely to represent a significant risk of ongoing ground movement. The recorded position of the faults are

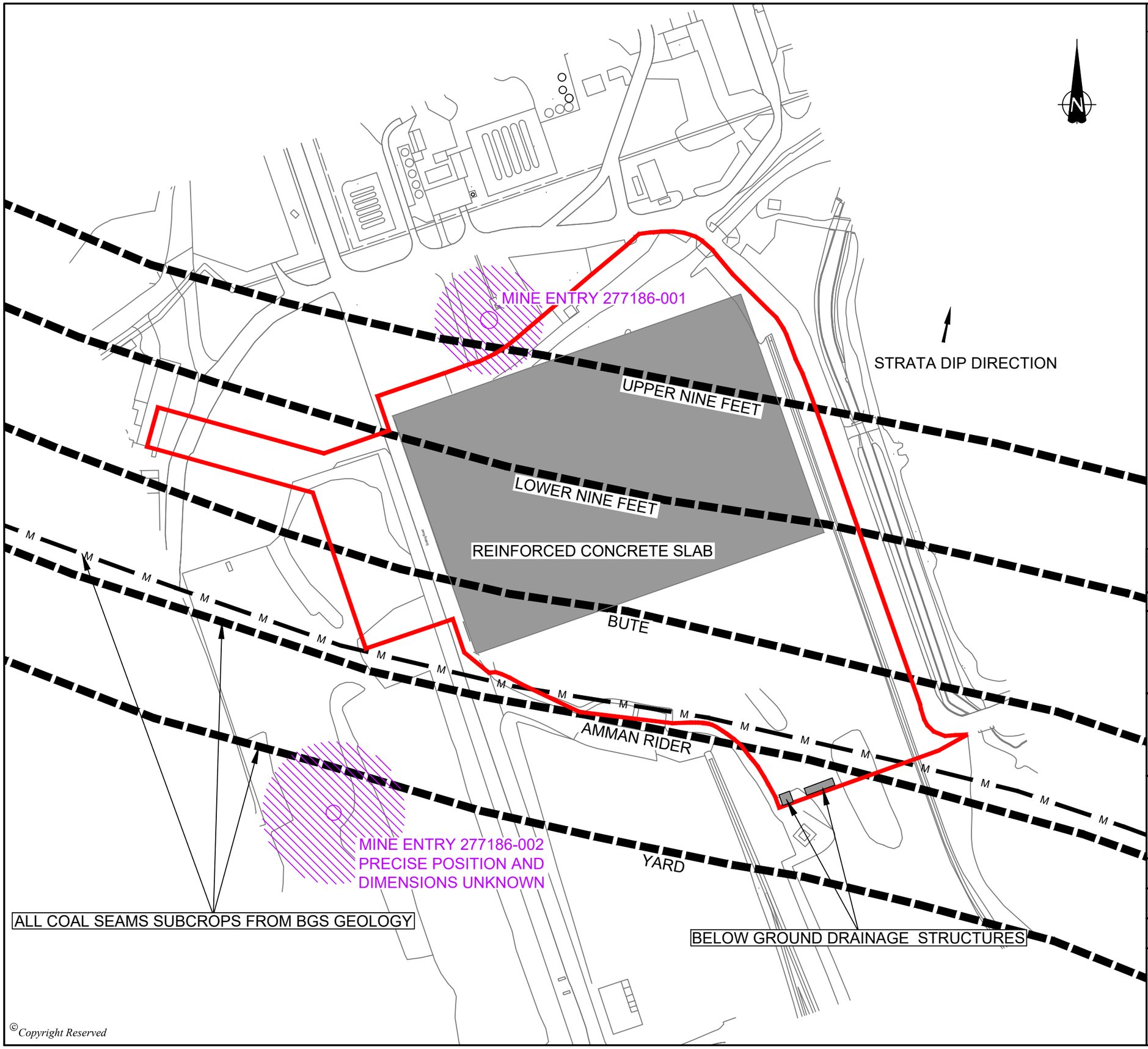
well outside the Site boundary and are considered unlikely to present a significant risk to the development.

Mine Gases

4.10 The presence of peat/organic soils and coal (and potential abandoned mine workings) at the Site provide possible sources of ground gas which may represent a risk to the safe occupation of the development. Geological faulting, granular soils and mine entries may also provide viable migration pathways for gas to reach the surface. A ground gas risk assessment, informed by a suitable programme of ground gas monitoring, is therefore recommended prior to construction works commencing at the Site. A below ground pumping station is proposed to be constructed at the Site and represents a confined spaces risk to construction and maintenance workers. Standard confined spaces risk management measures are anticipated to apply to any maintenance activities in respect to the proposed drainage infrastructure and similar controls are anticipated to be in place during the construction phase. On the basis that such controls provide for effective means to understand, mitigate and manage risks, it is considered to be sufficient to preclude the need for any further mine gas mitigation as part of the development.

4.11 Prior to carrying out any works which may intersect, disturb or enter any coal seams, coal mine workings or mine entries (within the ownership of the Coal Authority), the written permission of the Coal Authority shall be obtained. All mine entry and shallow mine workings investigation and treatment work should be carried out by appropriately competent persons, in general accordance with guidance contained within CIRIA C758D.

DRAWINGS



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DO NOT SCALE FROM THIS DRAWING

KEY

- SITE BOUNDARY
- COAL SEAM SUBCROP
- MARINE BAND
- MINE ENTRY
- MINE ENTRY ZONE OF INFLUENCE
- PROPOSED SLAB / STRUCTURE

NOTES

BACKGROUND MAPPING AND STRUCTURAL LAYOUT MODIFIED FROM:
SKANSKA DRAWINGS
"S24 808 - 05-113 A", &
"S24 808 - 05-101 A"
AND LAWRAY DRAWING
"EAF-LAW-P-X-DR-A-90104 P02"

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REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
A	FIRST ISSUE	08-08-24	AJC	RLM	RLM

CLIENT: TATA STEEL UK

PROJECT: P FIELDS

DRAWING TITLE: COAL MINING RISK ASSESSMENT

DRG No.	REV	SUIT. CODE
ST20879-002	A	--

DRG SIZE	SCALE	DATE
A3	1:2000	08 AUG 2024

DRAWN BY	CHECKED BY	APPROVED BY
AJC	RLM	RLM

wardell armstrong

N:\ST\ST20879 - PROJECT EAF - CMRA\03 - DESIGN\AUTOCAD\ST20879-002-A P FIELDS CMRA.DWG

APPENDICES

Appendix 1

Coal Authority Consultant Mining Report ref 51003442000001,

dated 5 August 2024

The Coal Authority

Consultants

Coal Mining Report

P Fields
Neath Port Talbot

Date of enquiry:	5 August 2024
Date enquiry received:	5 August 2024
Issue date:	5 August 2024
Our reference:	51003442000001
Your reference:	GSWA1-5KI-HDZ-2GR-WIG

Consultants

Coal Mining Report

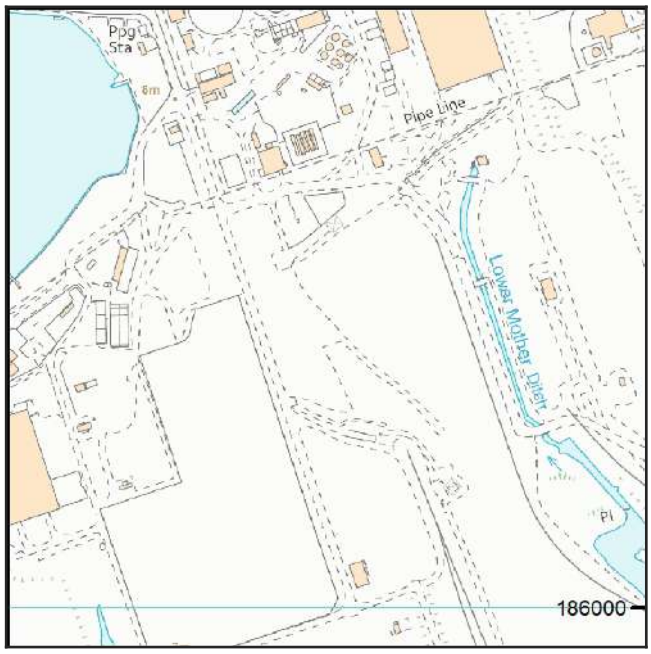
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

GROUNDSURE LIMITED

Enquiry address

P Fields
Neath Port Talbot



Approximate position of property

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How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

@coalauthority
/company/the-coal-authority
/thecoalauthority
/thecoalauthority

Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
MORFA	FIVE FOOT	Coal	4ECT	138	Beneath Property	18.5	North	330	1911
unnamed	GELLIDEG	Coal	4CMM	160	South	18.2	North	180	1856
MORFA	GELLIDEG	Coal	4ECX	206	Beneath Property	18.4	North	240	1855
unnamed	GARW VEIN	Coal	4ECW	308	North	18.5	North	90	1913

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	277186-001	277537 186402	This shaft has been filled to unknown specification	Coal	
Shaft	277186-002	277454 186139	This shaft has been filled to unknown specification	Coal	

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

SWR3735	6252	PO0
3654	5851	

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

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Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
LOWER 9FT AND BUTE	Coal	Yes	Within	N/A	105
LOWER NINE FOOT	Coal	No	Within	N/A	105
UPPER NINE FOOT	Coal	Yes	Within	N/A	101

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

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Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

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Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing
None recorded within 200 metres of the enquiry boundary.

Court orders
None recorded.

Section 46 notices
No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices
The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land
The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

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Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within 500m of the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

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Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk.**

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

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Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

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Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

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The Coal Authority

Summary of findings

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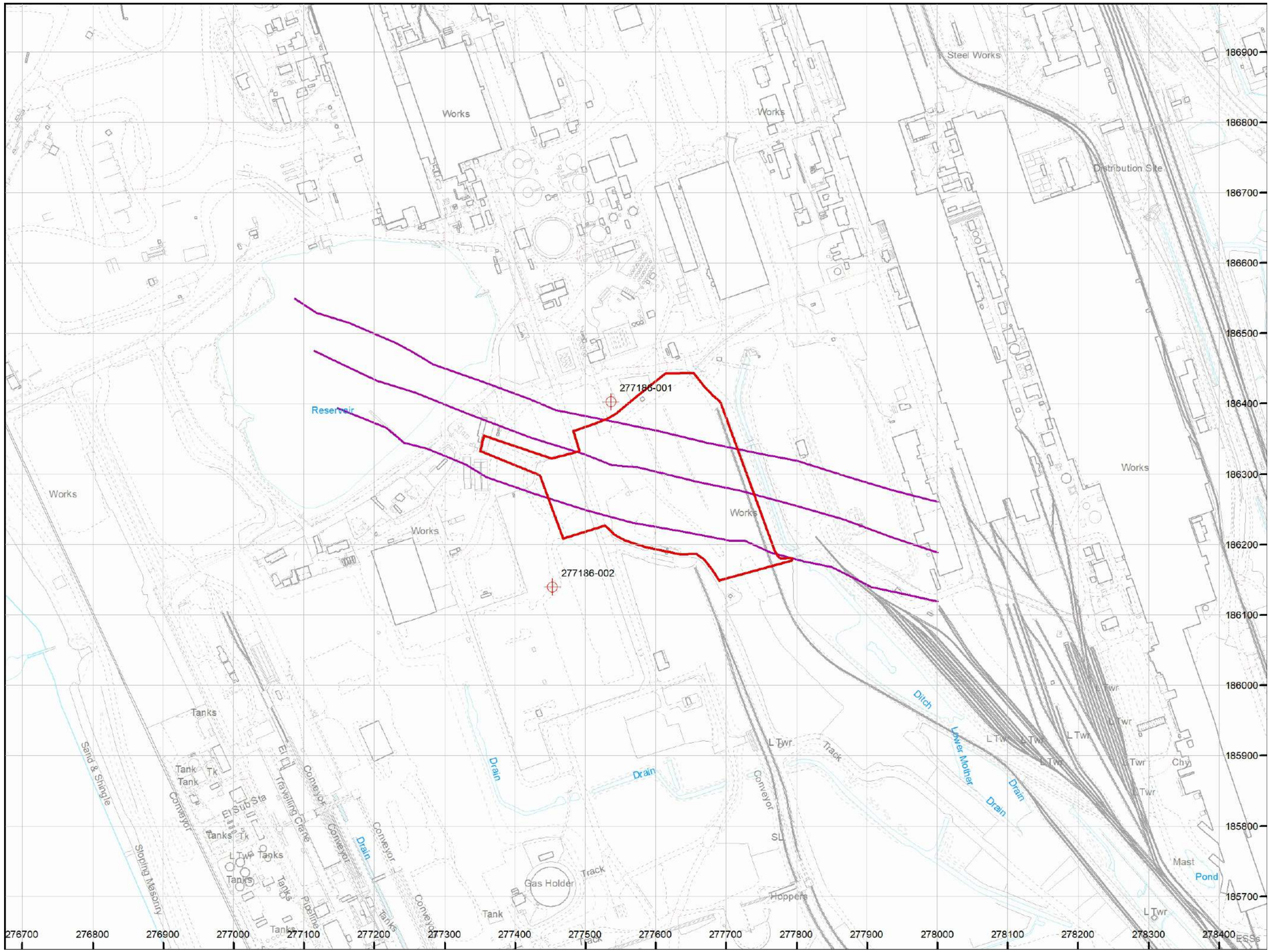
The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

Approximate position of the enquiry boundary shown

Disused mine shaft

Outcrop (Proven)



How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

Appendix 2

Coal Authority Mine Entry Datasheets',

dated 18 August 2021

The Coal Authority

Issued by:
The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848

WARDELL ARMSTRONG LLP	Our reference:	**71008090808001**
SIR HENRY DOULTON HOUSE	Your reference:	
FORGE LANE	Date of your enquiry:	**18 August 2021**
STOKE-ON-TRENT	Date we received your enquiry:	**18 August 2021**
ST1 5BD	Date of issue:	**18 August 2021**

This report is for the property described in the address below and the attached plan.

Shaft Plan and Data Sheets

TATA STEEL, PORT TALBOT, NEATH PORT TALBOT

I refer to the enquiry dated 18 August 2021, received 18 August 2021, in connection with the above.

As requested I enclose the mine entry data sheet(s) held for the mine entry/entries referred to.

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Mine Entry Data

Shaft/adit:	Shaft
Reference:	277186-001
Source:	1/2500 O.S Sheet Glam 33:6 1870 1900 1920 1940 Ed Ab plans 3654 5851A Geological Sheet Glam 33:NW 2nd Ed Other: Tonddu Roll 88
Colliery name:	Unknown
Entry name:	Morfa Colliery - Grange Downcast Pit
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	367.6
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	This shaft has been filled to unknown specification
Conveyance:	Not Applicable
Easting:	277537
Northing:	186402
Other information:	None

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Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	277186-002
Source:	1/2500 O.S Sheet Glam 33:6 1870 1900 1920 Ed Ab plans 3654 5851A Other: Tonddu Roll 88
Colliery name:	Unknown
Entry name:	Morfa Colliery - Abbot Upcast Pit
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	170.7
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	This shaft has been filled to unknown specification
Conveyance:	Not Applicable
Easting:	277454
Northing:	186139
Other information:	None

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Mine Entry Data (continued)

Shaft/adit:	Shaft
Reference:	277186-003
Source:	West Wales 6 inch Records SS78NE
Colliery name:	Unknown
Entry name:	Unknown
Date abandoned:	Unknown
Depth of superficial deposits (m):	Unknown
Depth of shaft (m):	Unknown
Diameter of shaft (m):	Unknown
Probable adit azimuth:	Not Applicable
Treatment details:	Unknown
Conveyance:	Not Applicable
Easting:	277432
Northing:	186150
Other information:	None

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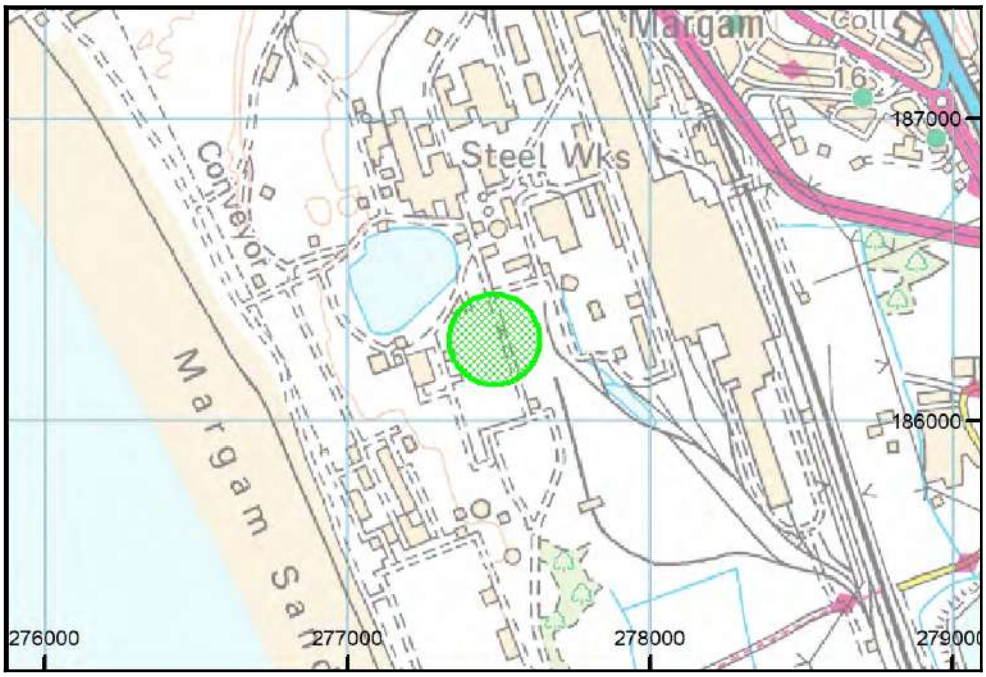
Location map

Approximate position of enquiry



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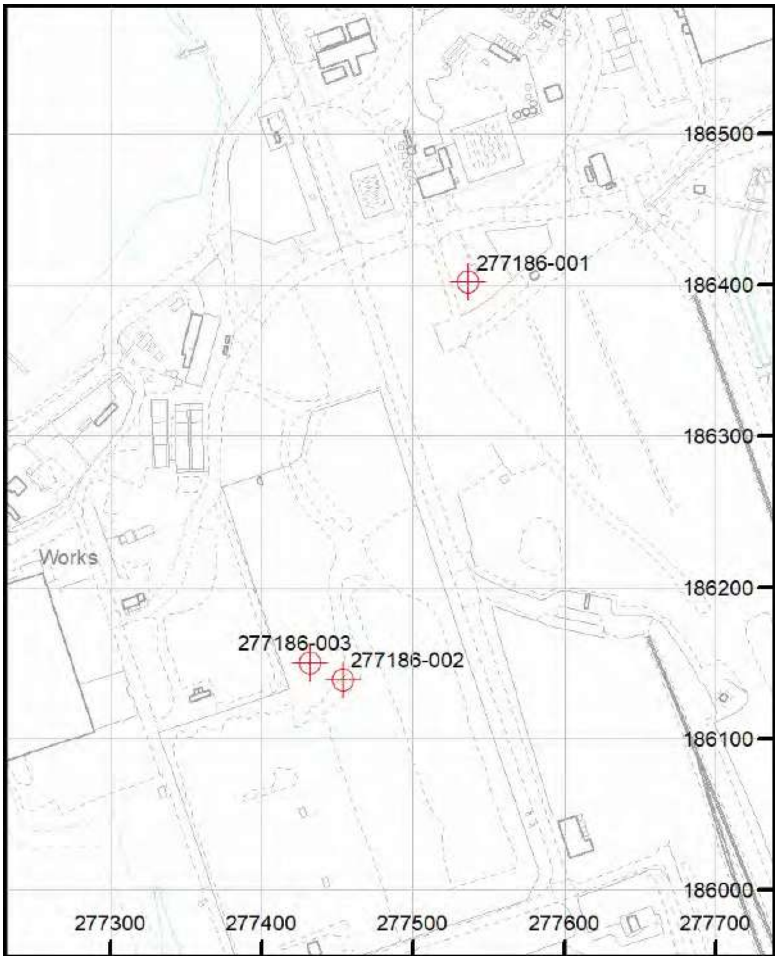


This plan shows the approximate location of the disused mine entry / entries referred to in the attached mining report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Property owners have the benefit of statutory protection (under the Coal Mining Subsidence Act 1991). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by visiting www.groundstability.com.

If you wish to discuss the relevance of any of the information contained in this report, you should seek the advice of a qualified mining engineer or surveyor. If you or your advisor wish to examine the source plans from which the information has been taken, these are available to view, free of charge, at our Head Office in Mansfield. To book an appointment please ring 01623 637225. Should you or your advisor wish to carry out a physical investigation that may enter, disturb or interfere with any disused mine entry, prior permission of the owner must be sought. For coal mine entries, the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries).

Our emergency telephone number is 01623 646333.

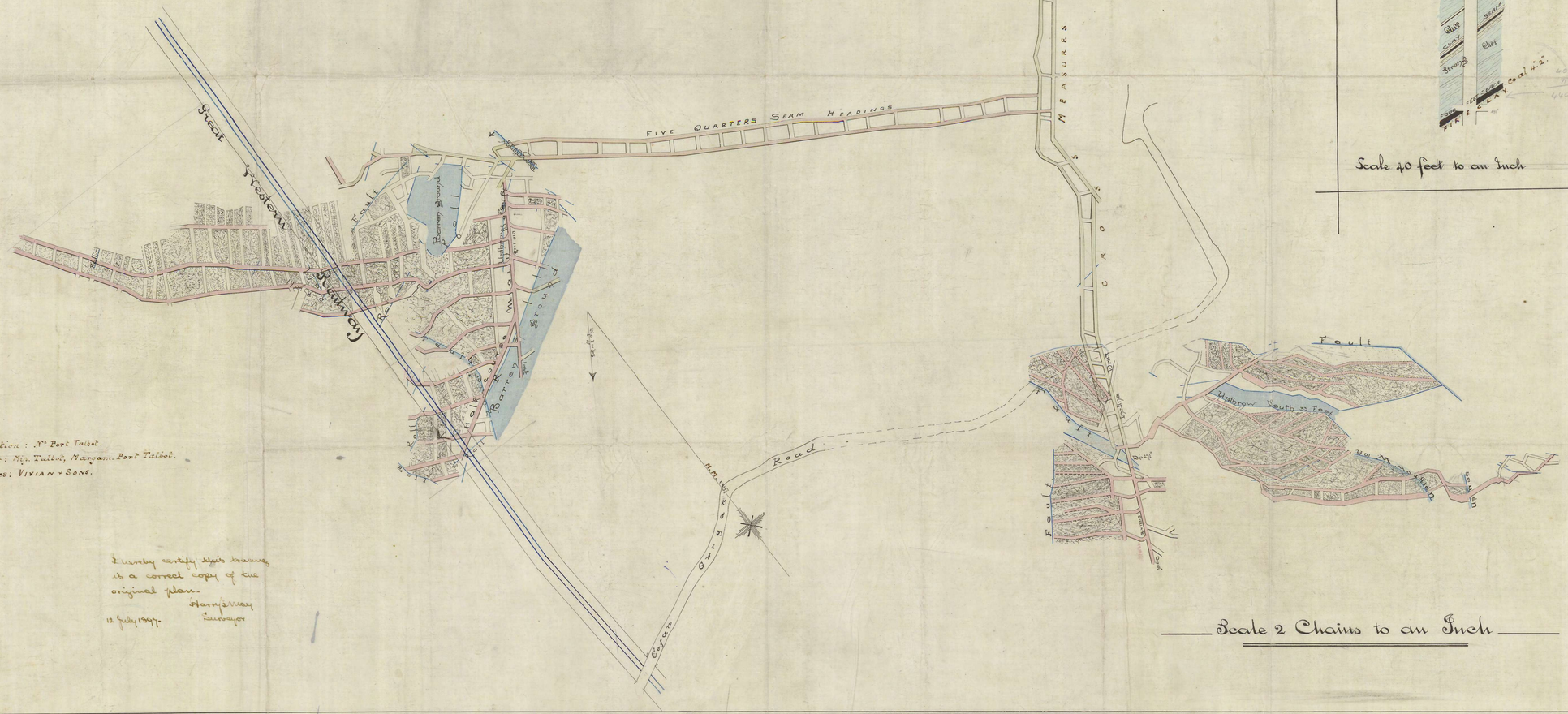
Key

Disused Adit or Mineshaft

Mapping sourced from Ordnance Survey

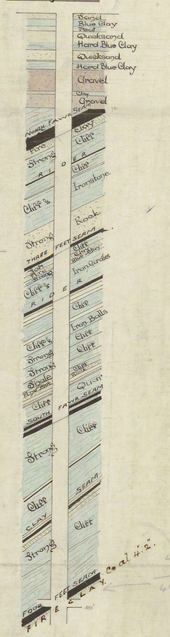
Plan of the Workings in the FOUR FEET SEAM with a Section of Strata sunk through Morfa Colliery

Harry Jeffrey 1847



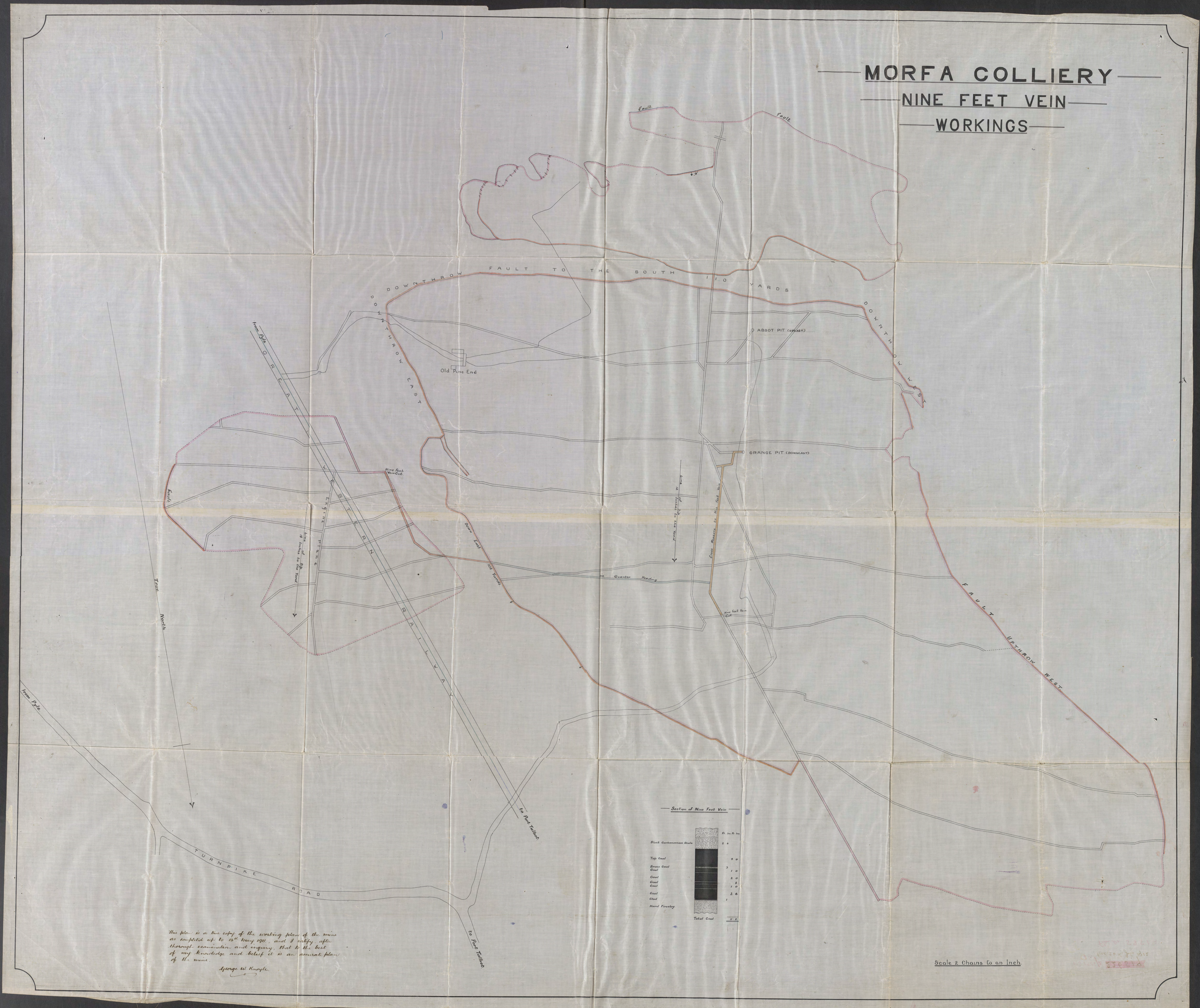
Scale 2 Chains to an Inch

Section at the Drange Shaft


Soil
Blue Clay
Sand
Quicksand
Hard Blue Clay
Quicksand
Hard Blue Clay
Gravel
Dry Gravel
Clay
Clay
Ironstone
Rock
Clay
Clay
Ironstone
Clay
Coal
Clay
Clay
Clay

MORFA COLLIERY

NINE FEET VEIN WORKINGS



ORDNANCE SURVEY

Scale 1:10,560 or 6 Inches to 1 Mile

SHEET SS 78 NE
& part of SS 78 NW

GLAMORGAN

ABERAVON CO. CONST.

PORT TALBOT MB & PH

PENYCAE

DOCKS

Works

MARGAM

Margam Sands

Margam Moors

Margam Burrows

Mynydd Brombil

Morfa Newydd

Margam Station

Craig Fawr

Ropeyard Plantation

Rifle Range

Coal Dump

Recreation Ground

Pillow Mounds

Earthwork

Yards 1000 0 1000 2000 3000 4000 5000 Yards

10 Metres

Made and published by the Dir
ORDNANCE SURVEY, CHESSI

Heights

Values are given in feet above Mean Sea Level at Newlyn.

Contours are at 25 feet vertical interval

Surface heights determined by ground survey / air survey

Bench Marks and their values are shown on Large Scale plans and Bench Mark lists containing fuller and possibly later levelling information are obtainable from the Director General, Ordnance Survey

Rock Features

Cliffs, Vertical, Concave, Outcrop, Scree

INDEX TO ADJOINING SHEETS

SS 79 SW & part of SS 78 NW | SS 79 SE | SS 89 SW
SS 78 NE & part of SS 78 NW | SS 88 NW
SS 78 SE | SS 88 SW

THE NATIONAL GRID

TO GIVE A GRID REFERENCE CORRECT TO 100 METRES

EXAMPLE — The Grange

The Grid letters on this sheet are SS

EAST: Take west edge of kilometre square in which point lies and read the large figures printed opposite this line on north or south margins. Estimate tenths Eastwards. 78 / 9 / 789

NORTH: Take south edge of kilometre square in which point lies and read the large figures printed opposite this line on east or west margins. Estimate tenths Northwards. 87 / 2 / 872

Full 100 Metre Reference SS 789872

The above Full Reference is unique. For many purposes the first grid letter can be omitted, giving a reference S 789872 which recurs at intervals of 500 Kilometres. If both grid letters are omitted, the resulting reference 789872 recurs at intervals of 100 Kilometres. When the area concerned is sufficiently restricted, as will usually be the case with maps on scales of one inch to one mile and larger, both the grid letters are normally omitted.

At the Eastern edge of this sheet True North is 1° 21' East of Grid North and at the Western edge 1° 25' East of Grid North. Magnetic North was about 8° West of Grid North in 1965, decreasing by about 5' in six years

1 square inch on this map represents 17.778 acres on the ground

The representation on this map of a road, track, or footpath is no evidence of the existence of a right of way

SURVEY DIAGRAM

1955-60	1951-62	1957-61	1951-52	1962	1962
1963	1951-63	1951-60	1952-60	1951-62	1962
1963	1963	1961	1951-62	1962	
1963	1961	1951-59	1962		
1963	1963	1963	1963		

The figures shown are the dates of surveys of the plans from which this map has been compiled.
H.W.M.M.T. surveyed 1955-63
L.W.M.M.T. surveyed 1949-63
Contours surveyed 1964
Boundaries revised to 1-5-63
Major roads revised 1963

Roads — Fenced / Unfenced
Motorways M (or A(M))
Ministry of Transport Classified Roads — Trunk A(T); Class I A1; Class II B1484
Cart Tracks — CT
Track — Tk; Footpath — FP
Roofed Building; Glasshouse; Ruin; Antiquity (site of); Triangulation Station; Sloping Masonry; Gravel Pit
Sand Pit; Other Pits; Quarry; Refuse & Slag Heaps; Boulders; Dunes; Electricity Transmission Line
Railway, Standard Gauge, Multiple Track; Sidings; Railway, Standard Gauge, Single Track; Level Crossing; Railway less than Standard Gauge; Embankments; Road over; Road under
Trees, Coniferous; Non Coniferous; Underwood; Bushes; Orchard; Rough Pasture; Pylon; Post
Furze; Osiers; Reeds; Marsh; Saltings; Direction of flow of water; Sand; Shingle; Lakes & Ponds

78 NE

SHEET SS 78 NE
& part of SS 78 NW