



Global Centre of Rail Excellence
Nant Helen
Powys and Neath Port Talbot

Written Scheme of Investigation for Archaeological Watching Brief
During Stage 1 and 2 Ground Investigations

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Unit 9
City Business Park
Easton Road
Bristol
BS5 0SP

www.wessexarch.co.uk

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Global Centre of Rail Excellence Nant Helen, Powys and Neath Port Talbot

Written Scheme of Investigation for Archaeological Watching Brief During Stage 1 and 2 Ground Investigation Works

1 INTRODUCTION

1.1 Project and planning background

1.1.1 Wessex Archaeology has been commissioned by Atkins Ltd to produce an updated written scheme of investigation (WSI) to include an archaeological watching brief during Stage 2 ground investigations (GI) within the 475 ha Global Centre for Rail Excellence site, Nant Helen, in Powys and Neath Port Talbot. This updated WSI includes archaeological monitoring of both the Stage 1 and 2 GI works. The Stage 1 works were located in two areas (**Figure 1**): a 12 ha area within the Onllwyn Coal Washery, Onllwyn, Neath Port Talbot, SA10 9NL (centred on NGR 284601 210662); and an 8 ha area of land to the south of the A4221, between Caehopkin and Coelbren, Powys, SA9 1UE (centred on NGR 283216 211930). The subsequent Stage 2 works cover the Washery and the remainder of the site, including the two electrified rail test loops (**Figure 1**).

1.1.2 The proposed Global Centre of Rail Excellence (GCRE) development comprises the construction of complementary earthworks to create two looped landform platforms (part in-cutting and part on embankment) with associated drainage infrastructure and areas of landscaping and habitat creation to create a flexible and adaptable area.

1.1.3 The Nant Helen Complementary Restoration Earthworks and associated GCRE development are both subject to planning approvals, with the complimentary earthworks being awarded in full by both Neath Port Talbot (P2020/0362) and Powys (20/0738/FUL) Councils, and outline planning permission for the wider GCRE scheme, again with Neath Port Talbot (P2021/0327) and Powys (21/0559/OUT) Councils. The following conditions relate to archaeology:

Condition 9 No development shall take place until the applicant, or their agents or successors in title, has secured the implementation of a programme of archaeological work in accordance with a written scheme of investigation, which has been submitted by the applicant and approved in writing by the Local Planning Authority. The archaeological programme of work will be undertaken and completed in accordance with the relevant Standards and Guidance laid down by the Chartered Institute for Archaeologists. A copy of the resulting report should be submitted to the Local Planning Authority. After approval by the Local Planning Authority, a copy of the report and resulting archive should also be sent to the Historic Environment Record Officer, Clwyd Powys Archaeological Trust for inclusion in the regional Historic Environment Record and the National Monuments Record, RCAHMW.

Condition 10 No development shall take place (including demolition, ground works, and vegetation clearance) until such time as the applicant, or their agents or successors in title, has secured the implementation of a programme of archaeological work in accordance with a written scheme of investigation, which has been submitted by the applicant and approved in writing by the Local Planning Authority. The archaeological programme of work will be undertaken and completed in accordance with the relevant Standards and Guidance laid

down by the Chartered Institute for Archaeologists. A copy of the resulting report should be submitted to the Local Planning Authority. After approval by the Local Planning Authority, a copy of the report and resulting archive should also be sent to the Clwyd-Powys Archaeological Trust, The Offices, Coed y Dinas, Welshpool, SY21 8RP for inclusion in the regional Historic Environment Record and the National Monuments Record, RCAHMW. Thereafter, the programme of work will be fully carried out in accordance with the requirements and standards of the written scheme.

- 1.1.4 The GI watching brief is part of a programme of archaeological works, which has been covered by a desk-based assessment (Arup 2020) and heritage impact assessment (Arup 2021). There will be further archaeological works elsewhere within the GCRE: details of these works will be covered by separate WSIs.

1.2 Scope of works

- 1.2.1 The current works comprise the Stage 1 and 2 Ground Investigations which include a range of geoarchaeological monitoring, including boreholes and test pits during Stage 1 in the Washery, located in the south of the site, and the earthworks site, located in the north of the site; and Stage 2, covering the Washery and the remainder of the site, including the two electrified rail test loops (**Figure 1**).

Stage 1 GI works

- 1.2.2 Within the Washery there are a total of 16 dynamic samples (S1-BH101 to S1-BH116) and five trial pits (S1-TP111 to S1-TP116) where archaeological monitoring is required and a further 10 trial pits (S1-TP1-1-110) located in the northern earthworks site.
- 1.2.3 A further 150 rotary probes and 4 rotary open hole (RO) boreholes will be drilled without recovery of core samples and will not require geoarchaeological monitoring.

Stage 2 GI works

- 1.2.4 The following interventions are to be undertaken as part of the Stage 2 Ground Investigations:
- 26 combination dynamic sampled (DS) and rotary cored (RC) boreholes with dynamic sampling through unconsolidated superficial deposits and rotary coring through bedrock to proposed depths of between 10 and 30 m below ground level (bgl);
 - 17 rotary cored (RC) boreholes with rotary coring to determine presence or absence of unextracted rock between areas of known opencast to depths of between 30 and 40 m bgl;
 - Seven possible mine shaft locations to be investigated by up to 25 rotary open hole (RO) probe holes to confirm location of shafts within collapse zones adjacent to the proposed alignment, to depths of between 25 and 55 m bgl;
 - Nine boreholes advanced using sonic drilling methods within areas of backfilled opencast to characterise backfill material to depths of between 10 and 40 m bgl; and
 - 121 machine excavated trial pits (TP) to depths of between 3.5 and 4.0 m bgl.
- 1.2.5 Of these, selected interventions will be excluded from the geoarchaeological monitoring, including rotary open hole (RO) boreholes, drilled without recovery of core samples, Interventions that will not encounter superficial geological deposits, and interventions located within areas of known opencast (see **Table 1**).

- 1.2.6 The work to be undertaken during the monitoring of the Stage 2 GI works includes monitoring of two boreholes yet to be completed during the Stage 1 GI works (S1-BH117 and S1-BH119) (see **Table 1**).
- 1.2.7 An archaeological watching brief will be maintained during initial groundworks (i.e., topsoil stripping and excavation of subsoil, peat, or modern overburden) of all areas not subject to other archaeological mitigation. Areas of confirmed modern opencast mining will not be subject to archaeological monitoring.
- 1.2.8 Indicative areas of modern opencast mining are shown on **Figure 2**, though the exact extents of the previously mined areas may be revised once the results of the Stage 1 and 2 ground investigation works are known. The trial pits selected for archaeological monitoring are shown in **Appendix 2**.

1.3 Scope of document

- 1.3.1 This WSI sets out the aims of the watching brief, and the methods and standards that will be employed. In format and content, it conforms to current best practice, as well as to the guidance in *Management of Research Projects in the Historic Environment* (MoRPHE, Historic England 2015a) the Chartered Institute for Archaeologists' (CIfA) *Standard and guidance for an archaeological watching brief* (CIfA 2014a) and Guidance for the submission of Data to the Welsh Historic Environment Records (Welsh Archaeological Trusts 2022).
- 1.3.2 This document will be submitted to Clwyd-Powys Archaeological Trust and Glamorgan-Gwent Archaeological Trust, the archaeological advisors to the Local Planning Authorities (LPA), for approval, prior to the start of the watching brief.

1.4 Location, topography and geology

- 1.4.1 The proposed GI watching brief is located within the Global Centre of Rail Excellence (referred to hereafter as 'the site'). The area of the Stage 1 works comprises Onllwyn Coal Washery (referred to hereafter as 'the Washery'); and an area of agricultural land to the south of the A4221, between Caehopkin and Coelbren, comprising part of the proposed northern embankment footprint. The Stage 2 works include the Washery and the remainder of the site, targeting the location of the two electrified rail test loops.

Mynydd y Drum

- 1.4.2 The main site is located on the uplands of Mynydd y Drum, a large part of which is occupied by Nant Helen opencast mine and its associated spoil tips. Mynydd y Drum is the highest part of a ridge of north-east to south-west aligned uplands between the Tawe, Nant Llech, and Dulais valleys.
- 1.4.3 This part of the site is defined by the line of former Swansea Vale Railway and the A4221 to the north, open moorland to the east and west, and by further moorland and the Neath & Brecon Railway to the south.
- 1.4.4 Mapped ground levels on Mynydd y Drum range between approximately 180 m OD near Caehopkin village, and 290 m near the summit of Mynydd y Drum, though the unmapped spoil tips of Nant Helen mine are likely to be higher.
- 1.4.5 The underlying geology on Mynydd y Drum is mapped as Carboniferous Mudstone, Siltstone, and Sandstone of the South Wales Lower Coal Measures Formation. There are deposits of Devensian till on the southern and western slopes of Mynydd y Drum, and an

area of peat in the centre of the site (British Geological Survey 2022). In some parts of the site, natural deposits are masked by deep deposits of made ground (coal mining spoil tips).

Washery

- 1.4.6 The Washery is located to the north of the villages of Onllwyn and Dyffryn Cellwen in the South Wales uplands at the head of the Dulais and Avon Pyrddin valleys. Topographically, the site is located on the southern edge of Gors Llywn bog, which is surrounded by the uplands of Mynydd Y Drum to the west, Hirfynydd to the south, and the foothills of the Black Mountains to the north.
- 1.4.7 The washery watching brief area is bounded by an area of scrubland known as Blaen-y-waun to the north, Onllwyn village to the south, and the Neath & Brecon Railway to the north-west. Most of the site is occupied by buildings, yards, roads, railways, earthworks, and spoil tips associated with the coal washery. Onllwyn Road, which has a bridge over the Neath & Brecon Railway, crosses the western edge of the site.
- 1.4.8 The ground within the washery is mostly level at a height of approximately 240 m OD.
- 1.4.9 The underlying geology is mapped as Carboniferous Mudstone, Siltstone, and Sandstone of the South Wales Lower and Middle Coal Measures Formations. At the northern edge of the site there are superficial deposits of peat, which form part of Gors Llywn bog, and there are deposits of Devensian till at the eastern end of the Washery (British Geological Survey 2022).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 Introduction

- 2.1.1 The archaeological and historical background was assessed in a prior desk-based assessment (DBA: Arup 2020), which considered the recorded historic environment resource within a 5 km study area of the development. A summary of the results is presented below, with relevant entry numbers from the Powys and Neath Port Talbot Historic Environment Records (HERs) and the Royal Commission on the Ancient Monuments of Wales (RCAHMW) included. HER entries are prefixed CPAT (Clwyd Powys Archaeological Trust). Scheduled monuments are prefixed GM. Finds reported to the Portable Antiquities Scheme are prefixed PAS. Additional sources of information are referenced, as appropriate.

2.2 Previous investigations related to the development

- 2.2.1 Several investigations were undertaken in advance of the development of Nant Helen opencast mine from 1986 onwards. There have been no previous investigations within the Onllwyn Coal Washery site.

Desk-based assessment (2020)

- 2.2.2 A DBA of the proposed Global Centre for Rail Excellence (GCRE) suggested that although some remains of structures associated with late 19th- and early 20th-century industrial activity may survive within the Onllwyn Coal Washery site, there is no evidence of these above ground, and the extensive nature of later industrial activity is likely to have removed most traces of any remains that may have existed (Arup 2020, 20).
- 2.2.3 As part of the DBA, a walk over survey of the site was undertaken. This identified numerous features associated with late 19th- and early 20th-century quarrying and coal mining the

area of the proposed GI works to the south of the A4221. The visible features include a capped mineshaft, trackways, spoil tips and a quarry.

Heritage impact assessment (2021)

- 2.2.4 A heritage impact assessment of the GCRE was undertaken by Arup (2021).

2.3 Geoarchaeological context

- 2.3.1 Geological mapping suggests that glacial till was locally present across the west, centre and south of the site, with localised peat deposits present infilling small depressions and basins. However, the Environment Statement highlights that the extent of Open cast mining activities in the 1980s and 1990s has likely resulted in the almost complete removal of Quaternary superficial deposits across the western and central portions of the site, including the peat deposits in the centre of the site.
- 2.3.2 Palaeoecological analysis of peat deposits was undertaken in the 1980s in advance of opencast mining activities, including deposits dating from the Mesolithic to Bronze Age. Radiocarbon dates on these cores of 8030±80 BP (CAR-1149, 7178-6656 cal BC) and 6240±60 BP (CAR-1155, 5326-5050 cal. BC), demonstrate a potential for survival of deposits back to the Mesolithic. The pollen data recorded human impacts on the environment from the Mesolithic and particularly during the Neolithic and Bronze Age. These impacts were most significant during the Bronze Age with progressive removal of deciduous woodland and development of the open moorland habitats which now characterise the wider landscape (CPAT 58788).
- 2.3.3 Areas of peat may locally survive across the site, particularly in Area C (on the northern edge of Mynydd y Drum), where although peat has not been recorded previously, the ground is nonetheless quite marshy. A small area of deep peat was also translocated in 1993 as part of earlier habitat restoration works.
- 2.3.4 Localised pockets of glacial till may also still be present in the south and west of the site though till has a low geoarchaeological potential.
- 2.3.5 Monitoring of GI works will determine the extent of survival of Quaternary superficial deposits, and where present, allow for the recovery of samples with palaeoenvironmental potential.

2.4 Archaeological and historical context

Mesolithic and Neolithic (9500–2200 BC)

- 2.4.1 A flint flake, possibly of Mesolithic date, was found during the excavation of Carn Goch round barrow (CPAT 681 and 12379; RCAHMW 304745) on Mynydd y Drum. Pollen extracted and analysed from nearby peat deposits suggests that woodland was being deliberately burnt during this period, potentially to create clearings for hunting. A Neolithic stone axe head (CPAT 44881) was also found on Mynydd y Drum.

Bronze Age and Iron Age (2200 BC–AD 43)

- 2.4.2 Pollen analysis indicates that the Bronze Age landscape of Mynydd y Drum comprised open land dotted with heath and hazel scrub (CPAT 58788).
- 2.4.3 There is no definitive evidence of Bronze Age occupation on Mynydd y Drum, although a settlement site of potentially prehistoric date was recorded prior to opencast mining, including a possible hut site and sections of boundary banks as well as clearance cairns (CPAT 12495). There is, however, considerable evidence for Bronze Age burial activity in

the wider area. This includes four known Bronze Age cairns, which form part of a larger alignment of cairns along the ridge of Mynydd y Drum.

- 2.4.4 Two of the cairns were excavated prior to their destruction by the Nant Helen mine. The first of these, Carn Goch, was a Bronze Age round barrow that was formerly designated as a scheduled monument (CPAT 681 and 12379; RCAHMW 304745). A further possible cairn, also within the site, was located slightly to the north of the alignment of other cairns (CPAT 4592), its identification is made difficult by its reuse as a modern sheepfold.
- 2.4.5 There are no known Bronze Age remains within the site, but a socketed copper alloy spearhead (PAS 30078) was found 0.3 km to the south of the washery.
- 2.4.6 There are no known Iron Age remains on the site, the nearest activity of this date being a hut circle and hillfort located 4 km and 3 km to the north-west of the site. During this period, the site would have lain within the territory of the Silures tribe.

Romano-British (AD 43–410)

- 2.4.7 The Roman conquest of the Silures was accomplished by the end of the AD 70s and forts and roads were subsequently constructed throughout the region.
- 2.4.8 There is no evidence of Roman-British activity within the site, but there is a Roman fort, marching camp, and road, only 0.5 km to the east of the washery. The marching camp (GM343) was probably constructed c. AD 74–8. A little further north is Coelbren Fort (GM146), which was a medium sized auxiliary fort that was constructed c. AD 75 and abandoned in the AD 140s. Excavation of the fort revealed a standard layout of timber buildings in the interior.

Early medieval (AD 410–1066)

- 2.4.9 During the early medieval period, the site would have lain within the southern extent of the kingdom of Brycheiniog or at the northern boundaries of the kingdom of Glywysing.
- 2.4.10 From the late 5th or early 6th-century to c. AD 755, Glywysing was ruled by the kings of Gwent. Thereafter, the kingdom remained independent until 942, when Morgan Hen united the kingdoms of Gwent and Glywysing to form the kingdom of Morgannwg. Following Morgan Hen's death in AD 974, the kingdom was split into its constituent halves. Glywysing remained independent until c. 1058, when it was conquered by Gruffudd ap Llywelyn, who subsequently became the first, and only, King of Wales. The Kingdom of Wales fragmented after Gruffudd ap Llywelyn's death in 1063, and Morgannwg returned to its former status as an independent kingdom. The last native ruler of Morgannwg, Iestyn ap Gwrgant, was deposed by the Norman lord Robert Fitzhamon c. 1090 (Pierce 1959; Hudson 2018; Thomas 1959; Wessex Archaeology 2017, 3).
- 2.4.11 The kingdoms of Brycheiniog and Dyfed were united in the 7th century and remained so until the mid-8th century. Brycheiniog was subsequently ruled as an independent kingdom, until it fell under the control of the kings of Deheubarth in the mid-11th century.
- 2.4.12 There are no known early medieval remains within the site, but a fragment from the shaft of a cross-slab (GGAT 00934w) was found at Cefn Hirfynydd, near Onllwyn, 0.35 km south of the washery. The carved stone shows part of a figure praying. Another inscribed stone was found in Coelbren (CPAT 683), 0.5 km to the north-east of the site.

Medieval (AD 1066–1500)

- 2.4.13 By the end of the 11th century, Norman marcher lords had established control over kingdoms of Brycheiniog and Morgannwg, which then ruled as the Lordships of Brecon and Glamorgan.
- 2.4.14 The only known medieval remains in immediate vicinity of the site, is one of three possible locations for a monastic grange known as Bleandulais, 1 km to the south-west of the washery.

Post-medieval (1500–1800)

- 2.4.15 The 1536 Act of Union united England and Wales and replaced the marcher lordships with thirteen shires, including Breconshire and Glamorganshire, the site being located on the border between the two.
- 2.4.16 During the post-medieval period the upland areas were used for sheep farming, breeding rabbits and the harvesting of natural resources such as fern, gorse, and kindling. Remains of this date, including a house platform (CPAT 6187), sheepfolds (CPAT 9770 and 23728–9), and enclosure banks (CPAT 6176 and 6184–5), clearance cairns (CPAT 6174–5, 6177–82, and 12496) on Mynydd y Drum, have been recorded in and around the site. Several of these features were destroyed by Nant Helen mine.
- 2.4.17 It was also during this period that small scale coal extraction began. Remains of early mining, comprising bell pits (CPAT 38565) and small depressions and scoops (CPAT 38566–7) created by opencast mining have been recorded on Mynydd Y Drum, and iron was being smelted at Ynysgedwyn Colliery as early as the 16th century.

Modern (1800+)

- 2.4.18 By the late 18th century, large scale coal mining was being undertaken throughout the South Wales Coalfield. The local coal is anthracite, which has a high carbon content, making it difficult to ignite, but ideal for smelting iron in hot blast furnaces, which were invented in 1828. It was at Ynysgedwyn, in 1838, that anthracite was first used for iron smelting, an innovation which was to lead to the dramatic industrialisation of the local area. Late 19th-century maps show many traces of earlier industrial activity, including old quarries, earlier coal levels and disused ironstone pits. Through historic maps, a succession of collieries, tramways and railways can be identified, illustrating the evolution of the district as it came to be one of the world's leading iron processing areas known as the 'iron cradle.'

Mynydd y Drum

- 2.4.19 Construction of the Swansea Canal in the Tawe Valley at the end of the 18th century, provided a connection between Abercarf and Swansea Docks. The Brecon Forest Tramroads were built to the north-east of the site in the early decades of the 19th century, connecting the limestone quarries in the Brecon Beacons to the Upper Swansea Valley. The Ystradgynlais Tramroad, also known as 'Claypon's Extension', is a scheduled monument (GM399; CPAT 19335, 21068, and 21081; RCHAMW 34628-9, 80115, 80119, 80122, 80124, 80129-35, 80145 and 80159) that runs along the east side of Mynydd y Drum. It was built in the 1830s to link the Brecon Forest Tramroad and the Swansea Canal with Drum Colliery and the ironworks at Ynyscedwyn. It is shown on the Ystradgynlais Tithe Map of 1844 as a single black line crossing 'Drim Common'. Both the Brecon Forest Tramroad and the Ystradgynlais extension were a hybrid between the earlier horse drawn mineral railways and the later locomotive railways. The Brecon Forest Tramroad was the work of the Scottish entrepreneur John Christie, but was taken on by his creditor, Joseph Claypon, following Christie's bankruptcy. Branch lines were later added to the Ystradgynlais

extension, connecting it to Onllwyn Colliery (RCAHMW 80161 and 80169) and the Banwen Ironworks. Claypon's Extension fell into disuse following the opening of the Dulais Valley Mineral Railway in 1864.

- 2.4.20 The Ystradgynlais Tithe Map of 1844 shows Mynydd y Drum, identified as 'Drim Common' (plot 2516), as unenclosed upland belonging to Nash Edwards Vaughan Esq. and occupied by William Williams. The Ystradgynlais Tramroad is depicted as an unlabelled black line. Nash Edwards Vaughan Esq. also owned the adjacent farm of Llwynllafröd (CPAT 127086), which was occupied by the British Iron Company. Four of the plots associated with this farm (Gwndwn Llwyd, Cae Uch Lawr Ty, Wain Issa, and Llwynllafröd farmhouse; plots 946–8 and 675), were located within the site.
- 2.4.21 The British Iron Company was a coal and ironstone mining and iron smelting company that was established in 1824. In 1825, the company purchased a small ironworks in Abercraf, which had been established by Thomas Harper the previous year. The ironworks was unsuccessful and closed in 1826, but the company continued to mine coal in this area until at least the 1841 (Raynolds 2005, 9–14; Birch 1967, 169–70, 204).
- 2.4.22 The related Tithe Apportionment records that to the west of Llwynllafröd Farm, was a field (Saith Erw or Gwain Mynydd; plot 949) belonging to William Williams Esq. and occupied Rees Williams, who also owned and occupied the next field to the west (Wain Fawr; plot 950). To the east of Llwynllafröd Farm was a block of five fields (Piece on the Drim, Wain Ucha, Croft, Knall Fach cottage and garden; plots 611–15), and a cottage and field (Deri Fach Cottage; plots 673–4), all belonging to Howell Gwyn Esq. and occupied by William Watkins. Howell Gwyn Esq. held a further two plots (Clyn yr Helin cottage, garden, and field; plots 618–19), which were occupied by Thomas Richards.
- 2.4.23 The next fields to the east (plots 609–10) formed part of Tir y Pant Farm, which belonged to Howell and Powell Gwyn Esq. and was occupied by Thomas Griffiths. The seventeen enclosures to the east of Tir y Pant Farm (Coed Cae Bach, Cae Brim Ucha, Wain Bach, woodland, Cae Ty Hwnt yr Ardd, Coed Cae Bach wrth Cefn y Ty, Coed Cae, Cae Llwyn Cradeg, Wain Issa, Heol y Gwydde, Wain Uch, Cae Bryn Mole, Pen y Bryn, and Ddwi Erw Galed; plots 166–7, 592–5, 598–608) belonged to James Price. Apart from Coed Cae (plot 599), which was occupied by the Rev. Jason Williams, all this land was occupied by Richard Davis. At the north-eastern edge of the site, adjacent to the A4221, there were two fields (Pen y Graig and Car Cefrn Bried; plots 160–1) that formed part of Pen y Graig Farm, which also belonged to Howell Glyn Esq. and was occupied by Thomas Richards.
- 2.4.24 The 1888 OS map (surv. 1877), depicts Mynydd y Drum as unenclosed rough grassland, interspersed with bogs and trackways. Old quarries for stone, ironstone, clay, and gravel depicted in various locations; along with several coal levels, shafts, and pits (RCAHMW 8014 and 80149), some of which were disused. The Ystradgynlais Tramroad is depicted as a trackway, labelled 'old tramway', running through various cuttings and embankments along the southern edge of Mynydd y Drum. Carn Goch round barrow, which was destroyed by later mining works, is depicted near the centre of Mynydd y Drum.
- 2.4.25 Many of the agricultural enclosures depicted on the 1844 Tithe Map on the northern slopes of Mynydd y Drum are depicted on the 1888 OS map. By this date there, was far more extensive quarrying in the area, with associated trackways and spoil tips depicted in the north-western quarter of the site.
- 2.4.26 Swansea Vale and Neath & Brecon Junction Railway, which opened in 1873, is depicted along the northern edge of the site. Abercraf Colliery and its associated railway sidings and

boilers are shown at the north-western edge of the site, with its accompanying levels, trackways, spoil tips extending up the hillside to the south. This mine was open by the Abercrave Colliery Co. in 1872 and remained operational until 1967. In 1897, there were 172 men employed at the mine (Welsh Coal Mines 2022b). By 1918, the workforce at Abercraf Colliery had grown to 208, and by 1923 there were 275 men employed at the mine (Welsh Coal Mines 2022b).

- 2.4.27 The names 'Holly Bush', 'Thorn', and 'Mountain Ash' are annotated to the south of the mine: but it is uncertain what the names denote. An unlabelled cottage, identified on the Tithe Map as Clyn y Helin, is depicted to the south-east of Abercraf Colliery, and Llwynllafrud Farm (CPAT 127086) is shown to the west.
- 2.4.28 The 1905 OS map (surv. 1903) depicts a similar layout as the preceding map, but with more extensive development around Abercraf Colliery. Features include new drifts, railway sidings, and an engine house. There is also a building, probably a cottage, to the south of the colliery labelled Pen-rheol. To the west of Abercraf Colliery, there were further colliery buildings, labelled 'International Purification Works' (identified on a 1921 map as a sewage and water works) and 'International Anthracite Colliery' (CPAT 127095 and 127087-4). This colliery, which was initially operated by the French Anthracite Co., existed by 1896, when 243 men were employed at the mine. By 1923 the mine had been acquired by Llwynllartrod Anthracite Collieries Ltd, who employed 262 miners. The mine was subsequently operated by Welsh Anthracite Collieries Ltd, which by 1932 had become a subsidiary of Amalgamated Anthracite Collieries Ltd. The mine closed between 1940 and 1945 but was subsequently worked in combination with Abercraf Colliery. The mine closed permanently in 1967 with a loss of 450 jobs (ibid.).
- 2.4.29 To the east of Abercraf Colliery, an 'old tramway' is depicted, at the southern end of which, a spoil heap, mining levels and an air shaft are depicted. The 1905 map also shows further mining activity on the south side of Mynydd y Drum, notably a new mine, labelled 'Drym Colliery', and its associated shafts, spoil tip and tramway to the west of Onllwyn Station.
- 2.4.30 The 1921 OS map (surv. 1913–14) depicts further mining development to the west of Onllwyn Station: Drym Colliery, renamed Dulais Colliery, had expanded significantly, and there are various buildings, an engine house, railway sidings, and a large spoil tip depicted alongside the Neath & Brecon Railway. Dulais Colliery was established in 1905 by the Dulais Anthracite Colliery Company Ltd. The mine closed prior to Nationalisation in 1947 (Welsh Coal Mines 2023).
- 2.4.31 On the north side of Mynydd y Drum, there was further development within the International and Abercraf collieries, including a tramway to a building labelled 'drift' and an adjacent spoil tip. The tramway depicted on the 1905 map had gone out of use by this date, and a new tramway running between a new mine, labelled 'Glynlech Colliery' (CPAT 125362) and the Swansea Vale and Neath & Brecon Junction Railway is depicted further to the east. There are further old levels and rises, presumably places where water flowed out of abandoned levels, in various locations. Glynlech Colliery was established in 1910 by the Glynlech Anthracite Colliery Co. Ltd. The company was dissolved in 1932 (Northern Mines Research Society 2022; Scripworld 2022).
- 2.4.32 The 1953 OS map (surv. 1948) depicts Mynydd y Drum as rough grassland, dotted with small spoil tips, rises and old levels, particularly on its northern and southern slopes. Glynlech Colliery is labelled, but no buildings or tramways are shown, which suggests that the mine was probably abandoned when the operating company was dissolved in 1932. By this date, the International and Abercraf collieries were being operated as a single mine,

known as the International Anthracite Colliery. There are further developments, including new buildings, railway sidings and spoil tips in the vicinity of this colliery. Dulais Colliery closed before 1947, and by 1948 most of its buildings had been demolished.

- 2.4.33 Passenger services on the Swansea Vale Railway were discontinued in 1950, but the line was kept in use to transport anthracite. The line closed following the collapse of the local mining industry in 1983.
- 2.4.34 The development of Nant Helen opencast mine (CPAT 19249; RCHAMW 410795) between 1986 and 2020 radically altered the topography of Mynydd y Drum. This mine contains a very large and deep opencast working in the north-western part of the site, and extensive spoil tips and trackways on the summit of Mynydd y Drum.

Onllwyn Coal Washery site

- 2.4.35 There were three collieries in the vicinity of the Washery, Drum Colliery (RCHAMW 80136, 80137, and 80139); Dulais Anthracite Colliery and Onllwyn Colliery (RCAHWMW 80161 and 80169). Drum Colliery was established before 1831, and later became part of Onllwyn No. 1 Colliery. This mine was developed in the 1840s by Evans and Bevan, who retained ownership until it was Nationalised in 1947 (Welsh Coal Mines 2022a).
- 2.4.36 The other major industry in the area was ironworking and there are several ironworks in the area, the closest of which, Onllwyn Iron Works (GGAT 05957w; RCHAMW 80144 and 80163), was located 0.2 km to the west of the site. An ironstone quarry (GGAT 06250w) is recorded to the south of Onllwyn, and limestone quarries and a lime kiln (GGAT 05316w) are noted 0.3 km to the east of the site.
- 2.4.37 The Cadoxton-Juxta-Neath Tithe Map of 1841 shows the Washery site as predominantly undeveloped land lying within three large enclosures, all owned by Capel Hanbury Leigh. The northern two fields (Coedcae and Waun Fawr; plots 3908–9), formed part of Ton Castle farm, which was occupied by Rees Benjamin: the south-western parcel of land and its associated farm were known as Yr Onllwyn (plots 3901–3). Several buildings are depicted in the centre of the land; these are identified as 'buildings and garden' and 'Drim Colliery.' There is a separate building with a small circular enclosure to the east of the colliery: this building, probably a farmstead, is identified on later plans as Rhos y Gelynen.
- 2.4.38 Further development of the transport infrastructure of the area came with the construction of the Dulais Valley Mineral Railway (GGAT: 02817.0w), which was incorporated in 1862, and extended as far as Onllwyn by 1863. Part of this railway, later known as the Neath & Brecon Railway, is still extant between Neath and Onllwyn, though passenger services were withdrawn in 1962.
- 2.4.39 The 1888 OS map (surv. 1876–7), depicts the site as undeveloped rough grassland, interspersed with bogs and small coal waste tips, and crossed by trackways. A tramway is shown running around the northern and eastern periphery of the site: this provided a link between Maesmarchog Colliery (later known as Waen Marchog or Onllwyn No. 3 Slant) and the Neath & Brecon Railway. The original Drum Colliery appears to have been abandoned by the mid-1870s, and in its place, there were three buildings: a smithy, post office and the Onllwyn Inn. Further to the west, there was a new mine, labelled 'Onllwyn Pit', with the associated settlement labelled 'Onllwyn'. By this date, the village comprised two rows of terraced houses (known as Front and Back Row) and an Independent chapel (RCAHWMW 13351 and 9488), which was built in 1846 (Dulais Valley Partnership 2022).

- 2.4.40 To the north of the village, there was a road bridge (GGAT 08085w) over the Neath & Brecon Railway, which provided access to Onllwyn Station (GGAT 02818.6w; RCAHMW 34838), a public house known as Halfway House, and trackways onto Mynydd y Drum.
- 2.4.41 The 1901 OS map (surv. 1896–7), shows a similar layout to the 1888 map. The most significant changes were that Onllwyn Pit had been abandoned and new workings, labelled ‘Onllwyn Colliery’ had been re-established on the site of Drum Colliery. Onllwyn Colliery (RCAHMW 80161 and 80169) is depicted as cluster of buildings with rail or tram tracks running between them. By this date, there was an infant school in Onllwyn village. At the eastern end of the site, ‘old coal levels’ are marked in three locations, along with an ‘old coal pit’, and ‘old quarries.’ The pit has been identified as Black Mine, and there are further unmapped workings known as Gwithien Felen Level and Ras Level within the Onllwyn Coal Washery site. These workings all formed part of Onllwyn No. 1 Colliery, which, by 1913, employed over 1,000 men (Welsh Coal Mines 2022a).
- 2.4.42 The 1921 OS plan (surv. 1913–14), shows further development in Onllwyn, comprising three new terraces of houses, a water reservoir, and numerous mine shafts and levels in and around the village. Further to the west, there was new mine, known as Dulais Colliery, along with a new road (Onllwyn Road) that linked the village to the rapidly expanding town of Severn Sisters. To the south-east of the site, there was a new village, named Dyffryn Cellwen, which contained mostly semi-detached houses, a school, a corrugated iron church dedicated to St David (RCAHMW 13435), and Bryn Seion Independent Chapel (RCAHMW 13352). The church and chapel were both built in 1925.
- 2.4.43 In 1932, Onllwyn Coal Washery (RCHAMW 306037) was constructed to process coal from local drift mines. The Washery, labelled ‘Colliery’ is depicted on the 1953 OS map (surv. 1948) as a cluster of large buildings grouped around extensive railway sidings. Aerial ropeways, spoil heaps, and a brickworks are also shown, as are two rows of new houses fronting onto the A4109. The tramway around the north and eastern periphery of the washery is labelled ‘Mineral Railway.’
- 2.4.44 In 1945, Onllwyn Colliery employed over 1,200 men, but by the time the mine was nationalised in 1947, the number of workers had halved. Onllwyn Coal Washery was re-equipped in 1950, and in 1955 a miners’ welfare hall (RCHAMW 414833) was constructed in the village.
- 2.4.45 Onllwyn Colliery closed in 1964 (Welsh Coal Mines 2022a). This led to a rapid decline in the local population. Onllwyn School closed in 1962, and the village’s original two terraces (Front and Back Row) were demolished in the late 1960s. Halfway House was demolished in the late 1970s. Onllwyn Independent Chapel (RCAHMW 13351 and 9488) was demolished in 1992 (Dulais Valley Partnership 2022).
- 2.4.46 Coal workers from Onllwyn were involved in several 20th-century strikes, and the 2014 film *Pride*, which chronicles the true story of a group of lesbian and gay activists who raised money to help families affected by the 1984 miners’ strike, is set in the village.
- 2.4.47 Onllwyn Coal Washery continued to operate under the National Coal Board (1947–87), the British Coal Corporation (1987–94), and Celtic Energy Ltd (1994–2022), who used it to process coal from Nant Helen and Derlwyn opencast mines. In 1998, Celtic Energy built a coal preparation plant at Onllwyn Coal Washery, and in 2005 they added a froth flotation plant to recover fine coal from washery slurry, which had until then been treated as waste. Nant Helen opencast mine closed in 2020; Onllwyn Coal Washery closed in August 2022 (Sherratt 2022, 68).



3 AIMS AND OBJECTIVES

3.1 Aims

3.1.1 The aims (or purpose) of the watching brief, as defined in the *ClfA Standard and guidance for an archaeological watching brief* (ClfA 2014a, updated 2020), are to:

- allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of the development or other works;
- provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard; and
- guide, not replace, any requirement for contingent excavation or preservation of possible deposits.

3.2 Objectives

3.2.1 In order to achieve the above aims, the objectives of the watching brief are to:

- determine the presence or absence of archaeological features, deposits, structures, artefacts or ecofacts within the specified works area;
- record and establish, within the constraints of the works, the extent, character, date, condition and quality of any surviving archaeological remains (a preservation by record);
- place any identified archaeological remains within a wider historical and archaeological context in order to assess their significance; and
- To determine, as far as is reasonably possible, the nature of the detectable geoarchaeological resource within the area of groundworks;
- Refine understanding of the presence, nature and distribution of Quaternary superficial deposits within the area of groundworks;
- Where appropriate/possible, obtain representative palaeoenvironmental samples from deposits of geoarchaeological potential;
- make available information about the archaeological resource on the site by preparing a report on the results of the watching brief.

4 FIELDWORK METHODS

4.1 Introduction

4.1.1 Health and safety will override archaeological considerations in all works since, as stated in ClfA guidance, *Health and Safety regulations and requirements cannot be ignored no matter how imperative the need to record archaeological information; hence Health and Safety will take priority over archaeological matters* (ClfA 2014a, 10).

4.1.2 All works will be undertaken in accordance with the detailed methods set out within this WSI. Any significant variations to these methods will be agreed in writing with the Clwyd-Powys Archaeological Trust or Glamorgan-Gwent Archaeological Trust and the client prior to being implemented.

Stage 1 GI works

- 4.1.3 The Stage 1 GI works include the following boreholes and trial pits:
- 4.1.4 At the Washery there are a total of 16 dynamic samples (S1-BH101 to S1-BH116) and five trial pits (S1-TP111 to S1-TP116) where archaeological monitoring is required and a further 10 trial pits (S1-TP1 to S1-TP110) located in the northern earthworks site.
- 4.1.5 A further 150 rotary probes and 4 rotary open (RO) boreholes will be drilled without recovery of cores and will not require geoarchaeological monitoring.

Stage 2 GI works

- 4.1.6 The following interventions are to be undertaken as part of the Stage 2 Ground Investigations:
- 26 combination dynamic sampled (DS) and rotary cored (RC) boreholes with dynamic sampling through unconsolidated superficial deposits and rotary coring through bedrock to proposed depths of between 10 and 30 m below ground level (bgl);
 - 17 rotary cored (RC) boreholes with rotary coring to determine presence or absence of unextracted rock between areas of known opencast to depths of between 30 and 40 m bgl;
 - Seven possible mine shaft locations to be investigated by up to 25 rotary open hole (RO) probe holes to confirm location of shafts within collapse zones adjacent to the proposed alignment, to depths of between 25 and 55 m bgl;
 - Nine boreholes advanced using sonic drilling methods within areas of backfilled opencast to characterise backfill material to depths of between 10 and 40 m bgl; and
 - 121 machine excavated trial pits (TP) to depths of between 3.5 and 4.0 m bgl.
- 4.1.7 Of these, selected interventions will be excluded from the geoarchaeological monitoring, as follows:
- Rotary open hole (RO) boreholes, drilled without recovery of core samples;
 - Interventions that will not encounter superficial geological deposits; and
 - Interventions located within areas of known opencast.
- 4.1.8 An archaeological watching brief will be maintained during initial groundworks (i.e., topsoil stripping and excavation of subsoil, peat, or modern overburden) of all areas not subject to other archaeological mitigation. Areas of confirmed modern opencast mining will not be subject to archaeological monitoring.
- 4.1.9 Indicative areas of modern opencast mining are shown on **Figure 2**, though the exact extents of the previously mined areas may be revised once the results of the Stage 1 and 2 ground investigation works are known. The trial pits selected for archaeological monitoring are shown in **Appendix 2**.
- 4.1.10 Before the start of the fieldwork, an accession code will be applied for.

4.2 Service location and other constraints

- 4.2.1 The client and/or their principal contactor will be responsible for the identification and protection of any above- and below-ground services within the watching brief area/s. The

client and/or their principal contactor will also be responsible for informing Wessex Archaeology of, and delimiting, any other areas of environmental, ecological or other constraints.

4.3 Geoarchaeological monitoring of GI works

Stage 1 GI works

- 4.3.1 The program of GI works includes 9no dynamic samples which will be geoarchaeological monitored to surface of the rockhead. A further 150 rotary probes will be drilled without recovery of cores and will not require geoarchaeological monitoring. A further 4 boreholes will also involve rotary open drilling and will not require geoarchaeological monitoring.
- 4.3.2 The work to be undertaken during the monitoring of the Stage 2 GI works includes monitoring of two boreholes yet to be completed during the Stage 1 GI works (S1-BH117 and S1-BH119) (see **Table 1**).

Stage 2 GI works

- 4.3.3 The Stage 2 GI works comprise a range of interventions (see 4.1) of which selected sequences will be monitored for geoarchaeological purposes, excluding rotary open holes drilled without recovery of core samples, those located in known areas of opencast, and those that will not encounter superficial geological deposits. The interventions selected for monitoring (excluding those not selected for monitoring) are shown in **Table 1**.

Table 1 Interventions selected for geoarchaeological monitoring during the Stage 2 GI works

Name	Type	Easting	Northing
S1-BH117	DS+RC	283463.63	210674.89
S1-BH119	DS+RC	283563.13	210856.61
S2-BH201	Sonic	282380.00	212069.00
S2-BH225	DS+RC	283428.00	211322.00
S2-BH227	DS+RC	283370.00	211163.00
S2-BH229	DS+RC	283861.00	210994.00
S2-BH232	DS+RC	283678.00	210868.00
S2-BH235	DS+RC	283012.00	210607.00
S2-BH236	DS+RC	282692.00	210581.00
S2-BH237	DS+RC	281690.00	210530.00
S2-BH238	DS+RC	284629.10	210519.10
S2-BH239	DS+RC	284622.30	210517.20
S2-BH240	DS+RC	284629.60	210514.10
S2-BH241	DS+RC	282705.00	210488.00
S2-BH242	DS+RC	284591.50	210461.60
S2-BH243	DS+RC	284769.90	210461.20
S2-BH244	DS+RC	284788.60	210449.00
S2-BH245	DS+RC	284575.80	210446.20
S2-BH246	DS+RC	284801.90	210446.10
S2-BH247	DS+RC	285161.40	210438.00
S2-BH248	DS+RC	284229.20	210434.60
S2-BH249	DS+RC	284799.00	210434.00
S2-BH250	DS+RC	284327.00	210433.90
S2-BH252	DS+RC	284394.80	210398.30

- 4.3.4 The attending geoarchaeologist will liaise closely with the GI team(s) on Site to ensure effective communication is maintained as the GI works proceed, that all parties understand

his/her role and the broad aims with regarding the monitoring/sampling. This can be achieved by means of a tool-box style talk from the geoarchaeologist at project start and when appropriate.

- 4.3.5 Ground Investigations will be carried out by experienced geotechnical engineers under the supervision of a suitably experienced member of Wessex Archaeology's geoarchaeological team. Whilst excavations are in progress the geoarchaeologist must maintain a safe distance from the GI team, but will be afforded access to the work area to describe, and if appropriate, request a sample of the deposits observed.
- 4.3.6 The supervising geoarchaeologist will record, describe and interpret the sequence of deposits encountered in order to allow assessment of likely geoarchaeological potential.
- 4.3.7 Where possible, selected cores will be retained as part of the sedimentary archive against which further works will be recommended. In the case of any purposive geoarchaeological cores, all of these will be available for selection and retention.

4.4 Archaeological watching brief methods

- 4.4.1 The watching brief will be undertaken by at least one archaeologist, subject to the number of site operations being carried out at any one time. All mechanical excavation will, where possible, be undertaken using a toothless ditching bucket and will be constantly monitored by the watching archaeologist.
- 4.4.2 Both the archaeological and GI contractors have been advised that they are not permitted to track on or over the Scheduled Monument to conduct the work. The GI contractor will provide a detailed traffic management plan during any works in the vicinity of the Scheduled Monument; the archaeological contractor will be fully briefed on, and observe, the detailed traffic management plan.
- 4.4.3 For the Stage 2 GI works, it is proposed that all trial pits are initially monitored for archaeological purposes, with the requirement for monitoring of the trial pits reviewed as the GI works progress.
- 4.4.4 Without causing unnecessary delay to the groundwork programme, the archaeologist may ask for the groundwork to be temporarily halted whilst investigations are carried out. If appropriate, areas of archaeological interest will be defined and suitably protected in advance of their investigation and recording.
- 4.4.5 Where necessary, the surface of archaeological deposits will be cleaned by hand. A sample of the archaeological features and deposits identified will be hand-excavated and recorded, sufficient to address the aims of the watching brief. Spoil derived from both machine stripping and hand-excavation will be visually scanned for the purposes of finds retrieval. Artefacts and other finds will be collected and bagged by context.
- 4.4.6 If extensive, complex or well-preserved archaeological remains are identified, for which the scope of the approved watching brief WSI is insufficient, the watching archaeologist will halt the groundwork, delimit the area of archaeological interest, and report immediately to the Wessex Archaeology project manager. Wessex Archaeology will then inform the groundwork contractor, the client, Clwyd-Powys Archaeological Trust and the Glamorgan-Gwent Archaeological Trust, as a contingent excavation or revised strategy may be required. The programme, and additional resources, for any contingent excavation will be agreed with the client. Accordingly, this WSI will need revising before any further



fieldwork proceeds – the revised WSI will need the approval of Clwyd-Powys Archaeological Trust and Glamorgan-Gwent Archaeological Trust, on behalf of the LPAs.

- 4.4.7 If human remains are uncovered, the specific methods outlined below (section 4.7.2) will be followed.

4.5 Recording

- 4.5.1 All exposed archaeological deposits and features will be recorded using Wessex Archaeology's pro forma recording system.
- 4.5.2 A complete record of excavated archaeological features and deposits will be made. This will include plans and sections, drawn to appropriate scales (generally 1:20 or 1:50 for plans, 1:10 for sections) and tied to the Ordnance Survey (OS) National Grid.
- 4.5.3 A full photographic record will be made using digital cameras equipped with an image sensor of not less than 10 megapixels. This will record both the detail and the general context of the principal features and the site. Digital images will be subject to managed quality control and curation processes which will embed appropriate metadata within the image and ensure long term accessibility of the image set.

4.6 Survey

- 4.6.1 The real time kinematic (RTK) survey of all archaeological features will be carried out using a Leica Global Navigation Satellite System (GNSS) connected to Leica's SmartNet service. All survey data will be recorded in OS National Grid coordinates and heights above OD (Newlyn), as defined by OSTN15 and OSGM15, with a three-dimensional accuracy of at least 50 mm.
- 4.6.2 If, due to unforeseen circumstances, it is not possible to survey using survey equipment prior to the destruction of the material, archaeological features will be located to either client plans that are related to OS mapping or structures/features that appear on OS mapping. This will be achieved using hand-held measuring tapes and the basic principles of triangulation.

4.7 Monitoring

- 4.7.1 The client will inform Clwyd-Powys Archaeological Trust and Glamorgan-Gwent Archaeological Trust of the start of the watching brief and its progress. Reasonable access will be arranged for the Clwyd-Powys Archaeological Trust and Glamorgan-Gwent Archaeological Trust to make site visits to inspect and monitor the progress of the watching brief. Any variations to the WSI, if required to better address the project aims, will be agreed in advance with the client, Clwyd-Powys Archaeological Trust and the Glamorgan-Gwent Archaeological Trust.

4.8 Finds

General

- 4.8.1 All archaeological finds will be retained, although those of clearly very recent origin with negligible potential to provide information relevant to the project aims and objectives may be recorded on site and not retained. Where appropriate, soil samples may be taken and sieved to aid in finds recovery. Any finds requiring conservation or specific storage conditions will be dealt with immediately in line with *First Aid for Finds* (Watkinson and Neal 1998).

Human remains

- 4.8.2 In the event of discovery of any human remains (articulated or disarticulated, cremated or unburnt), all excavation of the deposit(s) will cease pending Wessex Archaeology obtaining a Ministry of Justice licence (this includes cases where remains are to be left *in situ*).
- 4.8.3 Initially the remains will be left *in situ*, covered and protected, pending discussions between the client, Wessex Archaeology's osteoarchaeologist Clwyd-Powys Archaeological Trust and/or Glamorgan-Gwent Archaeological Trust regarding the need for excavation/removal or sampling. Where this is deemed appropriate, the human remains will be fully recorded, excavated and removed from site in compliance with the Ministry of Justice licence.
- 4.8.4 Excavation and post-excavation processing of human remains will be in accordance with Wessex Archaeology protocols and in-line with current guidance documents (e.g., McKinley 2013) and the standards set out in ClfA Technical Paper 13 (McKinley and Roberts 1993). Appropriate specialist guidance/site visits will be undertaken if required.
- 4.8.5 The final deposition of human remains subsequent to the appropriate level of osteological analysis and other specialist sampling/examinations will follow the requirements set out in the Ministry of Justice licence.

Treasure

- 4.8.6 Wessex Archaeology will immediately notify the client, Clwyd-Powys Archaeological Trust and/or Glamorgan-Gwent Archaeological Trust on discovery of any material covered, or potentially covered, by the *Treasure Act 1996*. All information required by the Treasure Act (i.e., finder, location, material, date, associated items etc.) will be reported to the Coroner within 14 days.

4.9 Environmental sampling

- 4.9.1 All sampling will be undertaken following Wessex Archaeology's in-house guidance, which adheres to the principles outlined in Historic England's guidance (English Heritage 2011 and Historic England 2015b).
- 4.9.2 Bulk environmental soil samples, for the recovery of plant macrofossils, wood charcoal, small animal bones and other small artefacts, will be taken as appropriate from well-sealed and dateable contexts. In general, features directly associated with particular activities (e.g., pits, latrines, cesspits, hearths, ovens, kilns, and corn driers) should be prioritised for sampling over features, such as ditches or postholes, which are likely to contain reworked and residual material.
- 4.9.3 If waterlogged or mineralised deposits are encountered, an environmental sampling strategy will be devised and agreed with the Clwyd-Powys Archaeological Trust and/or Glamorgan-Gwent Archaeological Trust as appropriate. Specialist guidance will be provided by a member of Wessex Archaeology's geoarchaeological and environmental team, with site visits undertaken if required.
- 4.9.4 Any samples will be of an appropriate size – typically 40 litres for the recovery of environmental evidence from dry contexts, and 10 litres from waterlogged deposits.
- 4.9.5 Following specialist advice, other sampling methods such as monolith, Kubiena or contiguous small bulk (column) samples may be employed to enable investigation of deposits with regard to microfossils (e.g., pollen, diatoms) and macrofossils (e.g., molluscs, insects), soil micromorphological or soil chemical analyses.

5 POST-EXCAVATION METHODS AND REPORTING

5.1 Stratigraphic evidence

- 5.1.1 All written and drawn records from the watching brief will be collated, checked for consistency and stratigraphic relationships. Key data will usually be transcribed into a database, which can be updated during any further analysis. The preliminary phasing of archaeological features and deposits will be undertaken using stratigraphic relationships and the spot dating from finds, particularly pottery.
- 5.1.2 A written description will be made of all archaeologically significant features and deposits that were exposed and excavated, ordered by period and/or feature group as appropriate.

5.2 Finds evidence

- 5.2.1 All retained finds will, as a minimum, be washed, weighed, counted and identified. They will then be recorded to a level appropriate to the aims and objectives of the watching brief. Recording and reporting will conform to the Type 1 (Description) level according to ClfA's *Toolkit for Specialist Reporting*, to include appropriate quantification and characterisation. The report will include a table of finds by feature/context.
- 5.2.2 Metalwork from stratified contexts will be X-rayed and, along with other fragile and delicate materials, stored in a stable environment. The X-raying of objects and other conservation needs will be undertaken by Wessex Archaeology in-house conservation staff, or by another approved conservation centre.
- 5.2.3 Finds will be suitably bagged and boxed in accordance with the guidance given by the relevant museum and generally in accordance with the standards of the ClfA (2014b).

5.3 Environmental evidence

- 5.3.1 Bulk environmental soil samples will be processed by standard flotation methods. The residues will be fractionated into 5.6/4 mm and 1 mm and dried if necessary. The coarse residue fraction (>5.6/4 mm), and the fine fraction when appropriate, will be sorted and discarded, with any finds recovered given to the appropriate specialist. The flot will be retained on a 0.25 mm mesh and scanned to assess the range of environmental remains present and their preservation. Unsorted fine residues will be retained until after any analyses and discarded following final reporting (in accordance with the Selection policy, below).
- 5.3.2 In the case of samples from cremation-related deposits the flots will be retained on a 0.25 mm mesh, with residues fractionated into 4 mm, 2 mm and 1 mm. In the case of samples from inhumation burial deposits, the sample will be wet-sieved through 9.5 mm and 1 mm mesh sizes. The coarse fractions (9.5 mm) will be sorted with any finds recovered given to the appropriate specialist together with the finer residues.
- 5.3.3 Any waterlogged samples will be processed by standard waterlogged flotation methods.
- 5.3.4 Recording and reporting will conform to the Type 1 (Description) level according to ClfA's *Toolkit for Specialist Reporting*, to include appropriate quantification and characterisation.

5.4 Reporting

5.4.1 Following completion of the fieldwork and the assessment of the stratigraphic, artefactual and ecofactual evidence, a draft report will be submitted for approval to the client, Clwyd-Powys Archaeological Trust and the Glamorgan-Gwent Archaeological Trust for comment. Once approved, a final version will be submitted.

5.4.2 The report will include the following elements:

- Non-technical bilingual summary;
- Project background;
- Archaeological and historical context;
- Aims and objectives;
- Methods;
- Results – stratigraphic, finds and environmental;
- Conclusions in relation to the project aims and objectives, and discussion in relation to the wider local, regional or other archaeological contexts and research frameworks etc;
- Archive preparation and deposition arrangements;
- Appendices;
- Illustrations; and
- References.

5.4.3 A copy of the final report will be deposited with the HER, along with surveyed spatial digital data (.dxf or shapefile format) relating to watching brief. Submission of data to the HERS will follow current guidance for the Submission of Data to the Welsh Historic Environment Records (Welsh Archaeological Trusts 2022). Final high-resolution PDF reports will be uploaded to the Clwyd-Powys Archaeological Trust (CPAT) HER submissions portal (<https://cpat.org.uk/heddos.html>).

Publication

5.4.4 If no further excavation works are undertaken, a short report on the results of the watching brief will be prepared for publication in a suitable journal, if considered appropriate and agreed with the client, Clwyd-Powys Archaeological Trust and Glamorgan-Gwent Archaeological Trust.

6 ARCHIVE STORAGE AND CURATION

6.1 Museum

6.1.1 It is recommended that the finds archive resulting from the evaluation be deposited with Neath Museum and/or Brecknock Museum and Art Gallery. Both museums will receive notification of the project prior to fieldwork commencing, and an accession number will be obtained if appropriate. The documentary archive will be deposited with the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW).

6.2 Transfer of title

6.2.1 On completion of the watching brief (or extended fieldwork programme), every effort will be made to persuade the legal owner of any finds recovered (i.e., the landowner), with the

exception of human remains and any objects covered by the *Treasure Act 1996*, to transfer their ownership to the museum in a written agreement.

6.3 Preparation of archive

Finds archive

- 6.3.1 Any finds (artefacts and ecofacts) will be prepared following the standard conditions for the acceptance of excavated archaeological material by Neath Museum and/or Brecknock Museum and Art Gallery, and in general following nationally recommended guidelines (National Panel for Archaeological Archives in Wales 2017; Brown 2011; ClfA 2014c; SMA 1995). The archive will usually be deposited within one year of the completion of the project, with the agreement of the client.

Documentary archive

- 6.3.2 The physical archive (paper records and graphics) and born digital data (site records, finds and environmental data, photographs, survey data and reports) will be prepared following the standard conditions for the acceptance of excavated archaeological material by Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) and in general following nationally recommended guidelines (Brown 2011; ClfA 2014c; SMA 1995).

Digital archive

- 6.3.3 The digital archive generated by the project will be deposited with a Trusted Digital Repository, in this instance the Archaeology Data Service (ADS), to ensure its long-term curation. Digital data will be prepared following ADS guidelines (ADS 2013 and online guidance) and accompanied by metadata, along with guidance for the submission of Data to the Welsh Historic Environment Records (Welsh Archaeological Trusts 2022).

Data Management Plan

- 6.3.4 Due to the amount and variety of digital data that will be created during the project a data management plan has been produced in compliance with the ClfA Dig Digital toolkit (**Appendix 3**) and the updated ClfA Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives (revised edition 2022). The plan will be reviewed at a minimum at the post-excavation and archiving stage.

6.4 Selection strategy

- 6.4.1 It is widely accepted that not all the records and materials (artefacts and ecofacts) collected or created during the course of an archaeological project require preservation in perpetuity. These records and materials will be subject to selection in order to establish what will be retained for long-term curation, with the aim of ensuring that all elements selected to be retained are appropriate to establish the significance of the project and support future research, outreach, engagement, display and learning activities, i.e., the retained archive should fulfil the requirements of both future researchers and the receiving Museum.
- 6.4.2 The selection strategy, which details the project-specific selection process, is underpinned by national guidelines on selection and retention (Brown 2011, section 4) and generic selection policies (SMA 1993; Wessex Archaeology's internal selection policy) and follows ClfA's *Toolkit for Selecting Archaeological Archives*. It should be agreed by all stakeholders (Wessex Archaeology's internal specialists, external specialists, local authority, museum) and fully documented in the project archive.
- 6.4.3 In this instance, given that the level of finds recovery is expected to be relatively low, decisions on selection will be deferred until after the fieldwork stage, and no detailed

strategy is presented here. Any material not selected for retention may be used for teaching or reference collections by the museum, or by Wessex Archaeology.

6.5 Security copy

- 6.5.1 In line with current best practice (e.g., Brown 2011), on completion of the project a security copy of the written records will be prepared in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

7 COPYRIGHT

7.1 Archive and report copyright

- 7.1.1 The full copyright of the written/illustrative/digital archive relating to the project will be retained by Wessex Archaeology under the *Copyright, Designs and Patents Act 1988* with all rights reserved. The client will be licenced to use each report for the purposes that it was produced in relation to the project as described in the specification. The museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use conforms to the *Copyright and Related Rights Regulations 2003*.

7.2 Third party data copyright

- 7.2.1 This document, the watching brief report and the project archive may contain material that is non-Wessex Archaeology copyright (e.g., Ordnance Survey, British Geological Survey, Crown Copyright), or the intellectual property of third parties, which Wessex Archaeology are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Wessex Archaeology. Users remain bound by the conditions of the *Copyright, Designs and Patents Act 1988* with regard to multiple copying and electronic dissemination of such material.

8 WESSEX ARCHAEOLOGY PROCEDURES

8.1 External quality standards

- 8.1.1 Wessex Archaeology is registered as an archaeological organisation with the Chartered Institute for Archaeologists (CIfA) and fully endorses its *Code of conduct* (CIfA 2014d) and *Regulations for professional conduct* (CIfA 2014e). All staff directly employed or subcontracted by Wessex Archaeology will be of a standard approved by Wessex Archaeology, and archaeological staff will be employed in line with the CIfA codes of practice, and will normally be members of the CIfA.

8.2 Personnel

- 8.2.1 The fieldwork will be directed and supervised by an experienced archaeologist from Wessex Archaeology's core staff. The overall responsibility for the conduct and management of the project will be held by one of Wessex Archaeology's project managers, who will visit the fieldwork as appropriate to monitor progress and to ensure that the scope of works is adhered to. Where required, monitoring visits may also be undertaken by Wessex Archaeology's Health and Safety manager. The appointed project manager and fieldwork director will be involved in all phases of the investigation through to its completion.
- 8.2.2 The analysis of any finds and environmental data will be undertaken by Wessex Archaeology core staff or external specialists, using Wessex Archaeology's standard

methods, under the supervision of the departmental managers and the overall direction of the project manager. A complete list of finds and environmental specialists is provided in Appendix 1.

8.2.3 The following key staff are proposed:

- Project Manager Alex Brown
- Fieldwork Director TBC

8.2.4 Wessex Archaeology reserves the right, where necessary due to unforeseen circumstances, to replace nominated personnel with alternative members of staff of comparable expertise and experience.

8.3 Internal quality standards

8.3.1 Wessex Archaeology is an ISO 9001 accredited organisation (certificate number FS 606559), confirming the operation of a Quality Management System which complies with the requirements of ISO 9001:2015 – covering professional archaeological and heritage advice and services. The award of the ISO 9001 certificate, independently audited by the British Standards Institution (BSI), demonstrates Wessex Archaeology's commitment to providing quality heritage services to our clients. ISO (the International Organisation for Standardisation) is the most recognised standards body in the world, helping to drive excellence and continuous improvement within businesses.

8.3.2 Wessex Archaeology assigns responsibility to individual managers for the successful completion of all aspects of a project including reporting. This includes monitoring progress and quality; controlling the budget from inception to completion; and all aspects of health and safety for the project. At all stages, the project manager will carefully assess and monitor performance of staff and adherence to objectives, timetables and budgets, while the manager's own performance is monitored by the team leader or regional director. The technical managers in the Graphics, Research, GeoServices and IT sections provide additional assistance and advice.

8.3.3 All staff are responsible for following Wessex Archaeology's quality standards but the overall adherence to and setting of these standards is the responsibility of the senior management team who, in consultation with the team leaders/regional directors, also ensure projects are adequately programmed and resourced within Wessex Archaeology's portfolio of project commitments.

8.4 Health and safety

8.4.1 All works will be undertaken in accordance with the *Health and Safety at Work Act 1974*; the *Management of Health and Safety at Work Regulations 1999*; and all other applicable health and safety legislation.

8.4.2 Wessex Archaeology has a fully compliant health and safety management system that has year on year satisfied the criteria for SSIP certification (Safety Schemes in Procurement). SSIP itself is aligned with PAS91.

8.4.3 Wessex Archaeology will, for all projects, produce one or more task and site-specific risk assessments and method statements (RAMS), which will ensure our staff can work safely on the site. A copy of the RAMS and our Health and Safety Policy can be provided to the client. All staff on our sites will be made fully familiar with the RAMS before work commences.



- 8.4.4 We aim to work collaboratively on health and safety with clients and, where separately appointed, with principal contractors. We expect clients to provide in good time all the necessary risk information about a site that may affect the archaeological work, such as locations of utilities or any known ground contamination. We will comply with the project specific Personal Protective Equipment (PPE) requirements, and any other specific additional requirements of the Principal Contractor.
- 8.4.5 All fieldwork staff are certified through the Construction Skills Certification Scheme (CSCS) and have undergone UKATA Asbestos Awareness Training. Staff who carry out specific tasks are suitably trained and competent to do so through training accredited by the Construction Industry Training Board (CITB), Institution of Occupational Safety & Health (IOSH) and the National Plant Operators Recognitions Scheme (NPORS).
- 8.5 Insurance**
- 8.5.1 Wessex Archaeology holds Employers Liability (£15,000,000), Public Liability (£15,000,000) and Professional Indemnity (£10,000,000) policies.

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APPENDICES

Appendix 1 Finds and environmental specialists

Name	Qualifications	Specialism
Sander Aerts	BA, MSc	Archaeoentomological remains, animal bone, marine shell and archaeobotanical remains (carbonised)
Phil Andrews	BSc; FSA; MCIfA	Slag and metal working debris
Ceridwen Boston	BSocSc; MA; MSc; DPhil	Osteoarchaeology; funerary archaeology
Elina Brook	BA; MA; PCIfA	Later prehistoric and Romano-British pottery, and small finds
Alex Brown	BA; MSc; PhD	Geoarchaeology, palynology
Kirsten Egging Dinwiddy	BA; MA; MCIfA	Human remains (inhumations)
Erica Gittins	BA; MA; PhD	Prehistoric flint
Phil Harding	PhD	Prehistoric flint, particularly Palaeolithic flint
Lorrain Higbee	BSc; MSc; MCIfA	Animal bone
Matt Leivers	BA; PhD; ACIfA	Prehistoric pottery and flint
Inés López-Dóriga	BA; MA; PhD	Archaeobotanical remains
Erica Macey-Bracken	BA; ACIfA	Post-medieval finds, ceramic building material and worked wood
Katie Marsden	BSc	Pottery from prehistoric to post-medieval/modern. Metalwork of all periods, including coins. Small and bulk finds including fired clay, ceramic building material, worked bone
Jacqueline McKinley	BTech; FSA	Human remains (inhumations and cremations)
Lorraine Mephram	BA; MCIfA	Pottery and other ceramic finds of all dates, concentrating on later prehistoric and post-Roman; ceramic building material; clay tobacco pipe; glass of Saxon or later date; small finds
Nicki Mulhall		Geoarchaeology and archaeobotanical remains
Daniel Young	BSc; MSc; MPhil	Geoarchaeology
Emma Robertson	BA; MSc	Human remains (inhumations)
Megan Scantlebury	BA, MSc	Archaeobotanical remains
Rachael Seager Smith	BA; MCIfA	Pottery with particular emphasis on Roman ceramics; and metalwork, fired clay, ceramic building material, stone, worked bone, shale, glass, and wall plaster
Andrew Shaw	BA; MA; PhD	Palaeolithic lithic artefacts and Pleistocene geoarchaeology
Amy Thorp	BA; MA	Pottery with emphasis on Roman ceramics, small finds
Ed Treasure	BSc; MRes; PhD	Archaeobotanical remains, including plant remains and charcoal/wood



Appendix 2 Stage 2 GI trial pits

Trial pit	Scheduled depth (m bgl)	Easting	Northing	Archaeological monitoring
S2-TP201	3.5	283339.00	211894.00	Yes
S2-TP202	3.5	282539.00	211892.00	No - opencast
S2-TP203	3.5	282139.00	211890.00	No - opencast
S2-TP204	3.5	282941.00	211890.00	Yes
S2-TP205	3.5	283741.00	211883.00	Yes
S2-TP206	3.5	281790.50	211859.00	No - opencast
S2-TP207	3.5	281562.50	211645.00	No - opencast
S2-TP208	3.5	283769.70	211575.00	No - opencast
S2-TP209	3.5	284014.40	211525.00	No - opencast
S2-TP210	3.5	281736.00	211493.00	No - opencast
S2-TP211	3.5	282941.00	211491.00	No - opencast
S2-TP212	3.5	282342.50	211489.00	No - opencast
S2-TP213	3.5	283455.50	211489.00	Yes
S2-TP214	4	283019.30	211428.10	No - opencast
S2-TP215	4	283043.60	211413.00	No - opencast
S2-TP216	4	283049.00	211396.30	No - opencast
S2-TP217	4	283094.50	211375.50	Yes
S2-TP218	4	283070.30	211371.10	No - opencast
S2-TP219	4	283122.40	211357.00	Yes
S2-TP220	4	283097.50	211355.70	Yes
S2-TP221	4	283135.50	211347.00	Yes
S2-TP222	4	283129.40	211336.50	Yes
S2-TP223	4	283185.50	211335.20	Yes
S2-TP224	4	283107.00	211331.40	Yes
S2-TP225	4	283144.70	211323.90	Yes
S2-TP226	4	283177.80	211308.80	Yes
S2-TP227	4	283081.10	211302.90	No - opencast
S2-TP228	3.5	283940.00	211294.00	No - opencast
S2-TP229	4	283134.20	211284.10	Yes
S2-TP230	3.5	283201.00	211274.00	Yes
S2-TP232	3.5	283181.00	211270.00	Yes
S2-TP233	3.5	283192.00	211259.00	Yes
S2-TP234	3.5	283178.00	211256.00	Yes
S2-TP235	4	283109.60	211249.50	No - opencast
S2-TP236	4	283267.70	211179.30	Yes
S2-TP237	4	283295.40	211162.10	Yes
S2-TP238	3.5	281381.00	211092.00	No - opencast
S2-TP239	3.5	283739.00	211092.00	Yes
S2-TP240	3.5	283340.00	211089.00	Yes
S2-TP241	3.5	282537.00	211077.00	No - opencast
S2-TP242	3.5	282952.90	211047.00	No - opencast
S2-TP243	3.5	282349.50	210999.00	Yes
S2-TP244	3.5	281848.90	210897.00	Yes
S2-TP245	3.5	281435.00	210893.00	No - opencast
S2-TP246	4	284982.90	210836.40	Yes
S2-TP247	4	285047.60	210779.90	Yes
S2-TP248	4	284868.10	210770.20	Yes



Trial pit	Scheduled depth (m bgl)	Easting	Northing	Archaeological monitoring
S2-TP249	4	285015.50	210727.80	Yes
S2-TP250	3.5	282539.00	210691.00	Yes
S2-TP251	3.5	282939.00	210690.00	No - opencast
S2-TP252	3.5	283341.00	210689.00	Yes
S2-TP253	4	285062.50	210673.20	Yes
S2-TP254	4	285156.30	210669.60	Yes
S2-TP255	4	283392.50	210603.00	Yes
S2-TP256	4	285237.00	210602.20	Yes
S2-TP257	4	285028.10	210598.30	Yes
S2-TP258	4	283401.90	210591.00	Yes
S2-TP259	3.5	283541.00	210591.00	Yes
S2-TP260	4	284486.60	210589.90	Yes
S2-TP261	4	284590.70	210580.70	Yes
S2-TP262	4	284635.40	210561.20	Yes
S2-TP263	4	284522.80	210551.20	Yes
S2-TP264	4	284402.10	210545.30	Yes
S2-TP265	3.5	281647.30	210545.00	Yes
S2-TP266	4	284585.10	210533.20	Yes
S2-TP267	4	284344.30	210531.10	Yes
S2-TP268	4	284678.60	210529.60	Yes
S2-TP269	4	284638.40	210520.60	Yes
S2-TP270	4	284379.20	210519.30	Yes
S2-TP271	4	284426.60	210518.50	Yes
S2-TP272	4	284997.90	210517.90	Yes
S2-TP273	4	284322.80	210517.70	Yes
S2-TP274	4	284627.20	210517.10	Yes
S2-TP275	4	284337.30	210515.80	Yes
S2-TP276	4	284895.30	210514.90	Yes
S2-TP277	4	284706.20	210510.80	Yes
S2-TP278	4	284325.50	210507.60	Yes
S2-TP279	4	284674.00	210506.30	Yes
S2-TP280	3.5	282808.30	210504.00	Yes
S2-TP281	4	285086.70	210503.10	Yes
S2-TP282	4	284743.70	210501.50	Yes
S2-TP283	4	285304.50	210494.10	Yes
S2-TP284	4	284637.10	210493.40	Yes
S2-TP285	3.5	283142.00	210491.00	Yes
S2-TP286	4	284576.70	210488.10	Yes
S2-TP287	4	284604.70	210482.90	Yes
S2-TP288	4	284668.90	210481.40	Yes
S2-TP289	4	284686.10	210478.00	Yes
S2-TP290	4	284530.30	210477.30	Yes
S2-TP291	4	284774.10	210477.00	Yes
S2-TP292	4	284711.60	210473.60	Yes
S2-TP293	4	284761.00	210471.10	Yes
S2-TP294	4	284639.90	210467.30	Yes
S2-TP295	4	284788.70	210465.30	Yes
S2-TP296	4	284525.20	210464.00	Yes
S2-TP297	4	284771.30	210463.20	Yes



Trial pit	Scheduled depth (m bgl)	Easting	Northing	Archaeological monitoring
S2-TP298	4	284827.20	210462.00	Yes
S2-TP299	4	284587.10	210461.60	Yes
S2- TP2100	4	285026.70	210461.50	Yes
S2- TP2101	4	284936.90	210461.00	Yes
S2- TP2102	4	284547.30	210460.10	Yes
S2- TP2103	4	284536.10	210459.30	Yes
S2- TP2104	4	284767.60	210458.50	Yes
S2- TP2105	4	284602.40	210454.70	Yes
S2- TP2106	4	284581.90	210453.20	Yes
S2- TP2107	4	284596.10	210449.30	Yes
S2- TP2108	4	284791.30	210447.60	Yes
S2- TP2109	4	284589.90	210445.10	Yes
S2- TP2110	4	284816.10	210444.80	Yes
S2- TP2111	4	284797.60	210441.70	Yes
S2- TP2112	4	284868.60	210441.70	Yes
S2- TP2113	4	284595.40	210439.90	Yes
S2- TP2114	4	284804.00	210426.90	Yes
S2- TP2115	3.5	283942.00	210392.00	Yes
S2- TP2116	3.5	282355.00	210388.00	Yes
S2- TP2117	3.5	282032.50	210365.00	Yes
S2- TP2118	4	284683.20	210357.10	Yes
S2- TP2119	4	285378.40	210348.30	Yes
S2- TP2120	4	284911.10	210312.90	Yes
S2- TP2121	4	285131.50	210297.00	Yes
S2- TP2122	3.5	283741.00	210290.00	Yes



Appendix 3 Data Management Plan



DATA MANAGEMENT PLAN

Section 1: Project administration/details

Project name		
Global Centre of Rail Excellence, Nant Helen		
Wessex Archaeology project number(s)		
271180 - 271182 - Global Centre of Rail Excellence, Nant Helen: Geoarchaeological and Archaeological monitoring of Stage 1 Ground Investigation Works 271182 - Global Centre of Rail Excellence, Nant Helen: Geoarchaeological and Archaeological monitoring of Stage 2 Ground Investigation Works		
External references		
- OASIS ID(s): tbc - Local Planning Authority and planning reference(s): 20/0738/FUL - Museum and accession number: tbc		
Project description		
Geoarchaeological and Archaeological monitoring of Stage 2 Ground Investigation Works, comprising watching brief on selected GI boreholes and test pits.		
Client		
Walters UK Ltd Hirwaun House Hirwaun Industrial Estate Hirwaun Aberdare CF44 9UL		
Project manager		
- Fieldwork: Dr Alex Brown and Kirsty Nichol, Wessex Archaeology - Post-excavation: tbc		
Principal investigator/researcher		
- Site director: Liz Chambers, Jasmin Lycett - Principal report writer: tbc		
Data contact person		
Moiria Taylor, Senior Finds and Archives Officer, Wessex Archaeology		
Version control		
Issue	Date	Description/summary of revisions
1	21/03/2023	DMP created
2	tbc	Revised at project review/reporting stage
3	tbc	Revised at archiving stage
Related documents, data management policies and guidance		
Project design/project-specific documentation		

Copies of files forming part of the digital archive will also be transferred to the Museum on request.

Data sharing restrictions

Data sharing will be subject to any restrictions identified in consultation with the client and other project stakeholders, e.g., those linked with client confidentiality, contractual obligations, commercial sensitivities, copyright/Intellectual Property Rights (IPR), legal compliance, ethical issues, security concerns and any other restrictions or sensitivities (see Section 4).

Exclusive use of the data may be required for limited periods where client approval is required, or longer term, dependent on the nature of sensitivities or restrictions identified with project stakeholders. A data sharing agreement (or equivalent) will be adhered to via a deposition licence. Agreed restrictions on data sharing will be documented through updates to the DMP and within the project archive.

Section 8: Responsibilities

Responsibilities

Project team

- Project manager(s): responsible for overseeing all aspects of the project from initiation to completion, including the implementation of the DMP and ensuring it is revised at relevant stages
- Project team members: responsible for data collection/creation, uploading/transfer and quality control (assured by the Project Manager)
- Core members of the project team are detailed in the Project Design (see Section 1)

Organisational-level responsibilities

- Archives team: responsible for preparation (including metadata production) and deposition of the project archive (including implementation of the approved Selection Strategy and DMP)
- Geomatics team: responsible for processing and quality control of geospatial (e.g., survey) and photogrammetric data, and maintenance of data collection equipment (e.g., cameras and survey instruments)
- IT team: responsible for development, maintenance/operation and support of the company's IT infrastructure (including data storage and backup facilities)



Wessex Archaeology Ltd registered office Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB
Tel: 01722 326867 Fax: 01722 337562 info@wessexarch.co.uk www.wessexarch.co.uk



FS 606559

- Wessex Archaeology 2023. *Global Centre of Rail Excellence Nant Helen, Powys and Neath Port Talbot, Written Scheme of Investigation for Archaeological Watching Brief During Stage 1 and 2 Ground Investigations*. Unpublished report ref. 271180.3, March 2023.

Wessex Archaeology guidance, standards, policy and procedures

Copies of selected documents available on request:

- Fieldwork/recording manuals
- Survey guide
- Photography guide
- Context/finds/environmental database and software user guides
- Style guide for reporting
- Archive preparation manual
- Union Square end user manual
- Union Square project management and accounting manual
- Quality Management System (QMS) policy, manual and process procedures
- Data protection and security policy and procedures (<https://www.wessexarch.co.uk/our-privacy-policy>)
- Data policies and procedures
- Copyright and Intellectual Property Rights (IPR) policy/procedures

External/national standards and guidance

This DMP has been compiled with reference to:

- Archaeology Data Service [ADS] 2013. *Caring for Digital Data in Archaeology: a guide to good practice*. Archaeology Data Service & Digital Antiquity Guides to Good Practice. Oxford: Oxbow Books.
- Archaeology Data Service [ADS] 2019. *Guidance on the Selection of Material for Deposit and Archive*, <https://archaeologydataservice.ac.uk/advice/selectionGuidance.xhtml> (accessed 05/10/22).
- Brown, D. H. 2011. *Archaeological Archives: A guide to best practice in creation, compilation, transfer, and curation* (2nd edition). Reading: Institute of Field Archaeologists/Archaeological Archives Forum.
- Chartered Institute for Archaeologists [CIfA] 2014. *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives* (revised edition October 2020). Reading: Chartered Institute for Archaeologists.
- Chartered Institute for Archaeologists [CIfA] 2014. *Standard and guidance for the collection, documentation, conservation, and research of archaeological materials* (revised edition October 2020). Reading: Chartered Institute for Archaeologists.
- Chartered Institute for Archaeologists [CIfA] 2022. *Toolkit for Selecting Archaeological Archives* <https://www.archaeologists.net/selection-toolkit> (accessed 05/10/22).
- Chartered Institute for Archaeologists [CIfA] 2022. *Toolkit for Managing Digital Data* <https://www.archaeologists.net/digdigital> (accessed 05/10/22).
- English Heritage 2012. *MIDAS: the UK Historic Environment Data Standard Version 1.1. Best practice guidelines*. Forum on Information Standards in Heritage (FISH).
- Forster, M. 2019. *Work Digital/Think Archive. A Guide to Managing Digital Data Generated from Archaeological Investigations*. Historic England, Chartered Institute for Archaeologists and DigVentures.
- Historic England 2015. *Digital Image Capture and File Storage*. Swindon: Historic England.
- National Panel for Archaeological Archives in Wales 2017. *The National Standard and Guidance to Best Practice for Collecting and Depositing Archaeological Archives in Wales 2017*.
- Welsh Archaeological Trusts 2022. *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)*. https://ggat.org.uk/cms/wp-content/uploads/2022/11/Guidance-for-the-Submission-of-Data-to-Welsh-HERs-V2_reducedEN.pdf (accessed 7 March 2023).

- Whyte, A. and Wilson, A. 2010. *How to Appraise & Select Research Data for Curation* (revised 15/08/16, v.1.1). Digital Curation Centre, <https://www.dcc.ac.uk/guidance/how-guides/appraise-select-data> (accessed 05/10/22).

Section 2: Data collection/creation

Data to be collected/created		
Data types that may be collected/created as part of this project are tabulated below.		
Detail on data types/formats/quantities intended for deposition will be added to this DMP as the project progresses; archive quantities will be specified prior to deposition.		
Type	Format	Archive quantity
Digital pro forma site records (context sheets, environmental sample records, trench sheets etc)	PDF (deposited in .pdf and converted to .pdf/a by ADS)	tbc prior to deposition
Spreadsheets (stratigraphic/contextual data, specialist data tables, metadata tables etc)	MS Excel (.xlsx, deposited in .xlsx and converted to .csv by ADS) and/or .csv	tbc prior to deposition
Spatial/survey data	ESRI shapefile (.shp, .shx and .dbf, plus associated files)	tbc prior to deposition
Site photographs (record, working and condition monitoring)	Raster image file (.jpeg)	tbc prior to deposition
Digital security copy scans of site permatrace drawings (plan and section drawings)	Raster image file (.tiff or .jpeg)	tbc prior to deposition
Digital security copy scans of paper site registers/records (context index, finds and samples registers, photo register, drawing register etc)	PDF (deposited in .pdf and converted to .pdf/a by ADS)	tbc prior to deposition
Grey literature/client reports (e.g., Written Scheme of Investigation, Post-excavation assessment and Updated Project Design) and individual specialist reports	MS Word (.docx, compiled and converted to .pdf at each issue, final versions deposited in .pdf and converted to .pdf/a by ADS)	tbc prior to deposition
Other specialist data (e.g., x-ray images, radiocarbon dating data and certificates, finds photographs)	Varies (typically doc.x, .xlsx, .csv, .pdf, .svg, .png, .jpeg, etc)	tbc prior to deposition
Ortho-photogrammetric (composite) images	Georeferenced raster image file (e.g., .tiff (GeoTiff) or .jpeg and associated world files; .jgw/.jgpw)	tbc prior to deposition
How data will be collected/created		
Data standards, collection/creation methods, storage and file naming Data will be collected/created in accordance with the Project Design and Wessex Archaeology's internal guidance, standards, policies and procedures, as informed by relevant best practise guidance and standards (see Section 1). Wessex Archaeology uses standardised procedures for: - data capture through site recording, survey and photography - data processing and management - post-excavation (e.g., specialist finds and environmental) data recording - digital archive preparation (including metadata creation)		

Data collected/created during the project will preferentially employ standardised file formats and be version controlled in accordance with Wessex Archaeology's standard procedures.

Standardised project folder structures are used to organise and compartmentalise project-specific data held on Wessex Archaeology's servers.

Standardised file naming conventions, which include unique identifiers, are used for site records and photographs, geospatial/survey data and project/client reports. For example:

- Context record: *WA_ProjectNumber_ContextNumber_Context_Record.pdf*
- Site photographs: *ProjectNumber_CameraNumber_Timestamp_ImageNumber.jpeg*
- Post-excavation assessment report: *ProjectNumber_SiteName_PXA.docx/pdf*

To facilitate data sharing and promote long-term future re-use, deposition file formats will be of archival standard, open-source and accessible in nature (e.g., standardised, openly documented and, where possible, non-proprietary), following national guidance (see Section 1) and the requirements of the Trusted Digital Repository (see Section 6).

Quality Assurance

Wessex Archaeology is registered as an archaeological organisation with the Chartered Institute for Archaeologists (CIfA) and fully endorses its *Code of Conduct and Regulations for Professional Conduct*.

Wessex Archaeology is an ISO 9001 accredited organisation (certificate number FS 606559), independently audited by the British Standard Institution (BSI), confirming the operation of a Quality Management System that complies with the requirements of ISO 9001:2015 – covering professional archaeological and heritage advice and services.

Project data is subject to quality control/checking at multiple stages, from collection/creation through to preparation of the archive for deposition, in accordance with Wessex Archaeology's Quality Management System (see Section 1).

Devices used in data collection are regularly maintained, calibrated and checked to ensure they are in full working order.

Section 3: Documentation and metadata

Documentation and metadata

Data collected/created as part of the project will preferentially employ standard formats that maximise opportunities for use and re-use (see Section 2).

Archived data will be accompanied by metadata in line with Archaeology Data Service (ADS) guidance. The metadata will be created automatically and/or manually during data collection/creation and preparation of the archive for deposition.

Where archives are suitable for ADS 'easy' deposition, Collection Level Metadata will be automatically applied on deposition from the associated OASIS record. A Collection Level Metadata Summary will be completed prior to deposition for projects requiring 'bespoke' ADS deposition; this will combine the overarching project details and a register of data types and number of objects included in the archive, along with all other archive components.

Metadata tables will be populated using the standard format for each data type as recommended by the ADS.

A catalogue documenting the contents of the physical and digital archive will be deposited with the Museum and Trusted Digital Repository (see Section 6).

Data documentation will meet the requirements of the Museum and Trusted Digital Repository.

Section 4: Ethics and legal compliance

Management of ethical, copyright and Intellectual Property Rights (IPR) issues

Wessex Archaeology has policies and procedures for dealing with personal information that meet the requirements of the *Data Protection Act 2018* (see Section 1). These detail what information Wessex Archaeology collects, the purpose of collecting this data, how it will be processed, stored, transferred and disposed of. Any sensitive data will be handled according to Wessex Archaeology data policy to ensure it is stored and transferred securely. The identity of individuals will be protected in line with the *General Data Protection Regulation* (GDPR). If required, data will be anonymised and redacted. Selection and retention of sensitive data for archival purposes will occur in consultation with the client and

other relevant stakeholders. Confidential data will not be selected for archiving and will be handled as per contractual obligations.

The full copyright of the project archive will be retained by Wessex Archaeology under the *Copyright, Designs and Patents Act 1988* with all rights reserved. Formal permission to include data from external specialists and contractors is secured on the engagement of the specialist or contractor. The project archive (including project reports) may contain material that is non-Wessex Archaeology copyright (e.g., Ordnance Survey, British Geological Survey, Crown Copyright), or the intellectual property of third parties, which Wessex Archaeology are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Wessex Archaeology. Users remain bound by the conditions of the *Copyright, Designs and Patents Act 1988* with regard to multiple copying and electronic dissemination of such material.

Deposit licences will be agreed with the Museum and Trusted Digital Repository (see Section 6) before data is deposited.

Permissions and/or licence agreements linked with data sharing (see Section 7) will form part of the project archive.

Section 5: Storage and backup

Data access, storage and backup

Risks to data security are managed in accordance with Wessex Archaeology's data policies and procedures (see Section 1).

Wessex Archaeology office networks are secured behind managed firewalls that are upgraded, updated, and reviewed on a regular basis. All internal core systems are Microsoft licensed products (Windows 10/11, Windows Server 2016, Windows Server 2019) and we implement Active Directory to manage all user accounts, security, services and access to systems data and resources.

Union Square, a proprietary project management system (PMS) used by Wessex Archaeology, is strictly license- and security-access controlled.

Wessex Archaeology employ various Microsoft cloud systems. Microsoft 365 is used for all standard Windows applications (Word, Excel, PowerPoint etc). Microsoft Teams, Microsoft SharePoint and Exchange Online are used as part of our business collaboration suite. Access to this is controlled via Active Directory on premises. Cloud based systems are password protected, with individual passwords linked to specific user accounts. Team and channel access within Microsoft Teams is limited to those requiring access, ensuring that information is only shared with the relevant individuals.

Wessex Archaeology uses the Esri ArcGIS suite, including ArcGIS Online, for its project work. Data held online through Esri is hosted on European Union servers.

Remote access to Wessex Archaeology systems and networks is controlled via secured Virtual Private Network connections (encrypted and security controlled). Access is only granted to Wessex Archaeology staff, controlled by secure user accounts and user-level access restrictions. Access is granted to individuals at the lowest security levels possible to enable them to carry out their roles.

Collaboration with external parties, where required, will be enabled via data access and sharing protocols that do not jeopardise data security. External specialists and contractors will be provided only with necessary files/data, using permissions-based access.

Data storage and backup procedures used by Wessex Archaeology to manage and secure working project archives are integral to standard project data collection/creation methods; see details in Section 2.

Wessex Archaeology also implement various levels of backup and disaster recovery using ARCServe UDP 7. Daily, weekly, monthly and annual backups and data replication are carried out. Online systems such as Sharepoint, Teams and Union Square are supported by live backups and version control.

Section 6: Selection and preservation

Data to be retained, shared and/or preserved

Not all digital data will be archived. In order to create a high quality, sustainable, concise and easily intelligible archive, all data will undergo a process of selection prior to deposition, as detailed in the project-specific Selection Strategy (see Section 1).

The Selection Strategy and DMP will be updated at project review points (e.g., at each stage of reporting and before deposition). Each iteration of the Selection Strategy and DMP will be finalised in agreement with the client and other project stakeholders. Where relevant, copies of the Selection Strategy and DMP will be included in project reports as appendices. The final versions of the Selection Strategy and DMP will be included in the deposited archive.

Selection will be informed by the Project Design (see Section 1), defined against the project research aims, regional and national research frameworks, specialist advice and the significance of the project results. The selected contents of the archive will be commensurate with their potential for re-use, future research and public benefit, and subject to any restrictions on data sharing (see Section 7) and considerations of financial and environmental sustainability.

Data selected for archiving will be converted to deposition file formats as required (see Section 2).

The data archive will be ordered, with files named and structured in a logical manner, and accompanied by relevant documentation and metadata, as outlined in Sections 2 and 3.

The project is expected to provide information suitable for inclusion in the Historic Environment Record (HER) (e.g., for the purposes of archaeological research or development control within the planning process).

With the agreement of project stakeholders, the data archive for projects with negative archaeological results will consist of the approved report(s) and a limited selection of images, deposited with ADS via OASIS.

Long-term preservation plan for the dataset

The digital archive will be deposited with the Archaeology Data Service (ADS), which is a Trusted Digital Repository with Core Trust Seal.

The physical archive will be transferred to Neath Museum and/or Brecknock Museum and Art Gallery. Copies of files forming part of the digital archive will also be transferred to the Museum on request. Upon identification of a suitable final repository for the physical archive, copies of files forming part of the digital archive will also be transferred to them on request.

Approved client/grey literature reports will be made available via OASIS and supplied directly, on request, to the Historic Environment Record (HER).

Contact with intended data repository

The ADS will be contacted prior to deposition of the digital archive where necessary (e.g., for projects requiring 'bespoke' deposition).

Neath Museum and/or Brecknock Museum and Art Gallery will be contacted to ascertain their requirements for the content and delivery of the archive.

Archiving costs

Archiving costs will be reviewed at appropriate stages during the creation and implementation of the (iterative) Project Design (see Section 1), and quotes obtained from the intended data repository where relevant.

The resources required to implement the archiving strategy agreed with project stakeholders will be subject to contractual arrangements.

Section 7: Data sharing and accessibility

Data sharing plan

The project results will be disseminated through grey literature/client reports and, where appropriate, publication – the format and scope of which will be agreed with the client and other project stakeholders as detailed in the relevant iteration of the Project Design (see Section 1). The location of the project archive will be included in grey literature/client reports and publications.

Subject to stakeholder agreement, the project results may also be shared via a range of accessible media and portals.

The ADS will disseminate the deposited digital archive under its Terms of Use and Access, data sharing guidelines and deposition licence, and the dataset will receive a unique identifier Digital Object Identifier (DOI).

An OASIS form will be completed for each phase of work associated with the project. Alternatively, details relating to individual phases of work will be collated under a single OASIS entry. The location(s) of the archive will be added to OASIS on deposition. Approved versions of client/grey literature reports will be uploaded to the associated OASIS record(s).

Digital copies of approved client/grey literature reports will be made available to the Historic Environment Record (HER) through OASIS. Geospatial/survey data forming part of the digital archive will be supplied, on request, to the HER.