# Proposed Nuclear Power Station Wylfa, Ynys Môn

## Archaeological Watching Brief: Ground Investigation Works

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

# Proposed Nuclear Power Station Wylfa, Ynys Môn

## Archaeological Watching Brief: Ground Investigation Works

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**PROPOSED NUCLEAR POWER STATION, WYLFA YNYS MÔN ARCHAEOLOGICAL WATCHING BRIEF: Ground Investigation Programme (G2096)**


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**PROPOSED NUCLEAR POWER STATION, WYLFA YNYS MÔN ARCHAEOLOGICAL WATCHING BRIEF & STRIP/MAP/SAMPLE: Ground Investigation Programme (G2096)**

*Summary*

*Gwynedd Archaeological Trust (GAT) has completed a programme of archaeological mitigation (watching brief and strip/map/sample) within the proposed development site for the new nuclear power station site at Wylfa, Ynys Môn (NGR SH35459328). The watching brief monitored intrusive groundworks associated with a ground investigation (GI) scheme completed by Horizon Nuclear Power as part of a multiplatform survey of the development area. An approximate total of 13,155.31m$^2$ was excavated across the development zone.*

*In tandem with the watching brief, GAT interpreted the results of a Vertical Magnetic Gradiometry (magnetometer) survey, completed for Horizon Nuclear Power by Fugro Aperio Limited. This interpretation was completed during the ground investigation scheme. As part of the scheme Fugro Aperio targeted specific anomalies via test pitting, which were monitored by GAT as part of the watching brief.*

*As well as the Fugro Aperio survey / test pitting, the GI scheme involved a number of different components ranging from borehole drilling to large scale trenches (seismic survey). During the watching brief for the Fugro Aperio test pits, two possible prehistoric burnt mound sites were identified in the southern part of the development, however no other significant archaeological remains were identified.*

*The majority of identified archaeology was limited to nineteenth century land management: the plots to the south of Wylfa A included redundant field boundaries and drainage systems associated with the local farms. Most of these features were identified during the haul road watching brief and the strip/map/sample for the seismic survey observation trenches and were extant on historic mapping from the late nineteenth century.*

*Disturbance associated with the construction of Wylfa A was identified during the GI programme within the areas to the immediate north and south of Wylfa A. In field F1, to the south of Wylfa A, the upper deposits were characterised by frequent inclusions of industrial waste; in places this reinstated ground was shown to be over 3.0m in depth, whilst in situ features including concrete pads and subterranean tanks found within the northern part of F1 indicated the location of the main construction compound for Wylfa A. This area is now covered by a fairly thin layer of topsoil, and turf and is used for grazing.*

*The watching brief has been completed as part of a staged programme of works by GAT for Horizon Nuclear Power and the results of the watching brief will inform future archaeological works.*

## 1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) was commissioned by Horizon Nuclear Power to complete a programme of archaeological mitigation as part of the Ground Investigation (GI) scheme in advance of the proposed construction of a new nuclear power station at Wylfa, Ynys Môn. The site of the proposed Nuclear Power Station is located adjacent to the existing Wylfa 'A' power station and encompasses a 161.1 hectare area of coastline, agricultural plots and buildings, centred on NGR

**SH35459328**. This GI watching brief was completed in response to Cyngor Ynys Môn Planning Decision notice **20C265**.

The watching brief monitored an approximate total of 13,155.31m$^2$ of excavated ground.

As part of the GI scheme, Horizon Nuclear Power completed a Vertical Magnetic Gradiometry (VMD) survey across the proposed development zone, using a pair of Caesium vapour magnetometers to identify below ground anomalies. The survey identified 146 anomalies (Figure 5), 10 of which were investigated further as part of the GI scheme by Fugro Aperio Ltd (via test pits; cf. para. 4.5; Figure 5). The results of the VMD geophysical survey were interpreted by GAT during the GI programme (GAT Report **987**/Appendix I) and specific anomalies were subsequently targeted by GAT using on completion of the GI works for additional geophysical survey (GATReport **987**).

### 1.1 Guidelines

A detailed brief for archaeological works associated with the Ground Investigation Programme was not prepared by GAPS but GAPS has been involved in the specification of the archaeological works (GAPS project ref.: **D1315**). GAPS approved the GAT project design (email correspondence 02/03/11).

The design for this phase of works also conforms to the guidelines specified in *Standard and Guidance for Archaeological Watching Brief* (Institute for Archaeologists, 1994, rev. 2001, 2008).

## 2 PROJECT BACKGROUND

### 2.1 Archaeological Background

Gwynedd Archaeological Trust completed an archaeological baseline assessment of the proposed Nuclear Power Station development area in March 2010 (Davidson, A., GAT Report **842**). A total of thirty-one archaeological sites and features were identified within the baseline area. None of the identified archaeology was directly affected by this phase of GI works.

## 3 METHODOLOGY

The Ground Investigation (GI) zone encompassed the proposed development area. The GI programme / archaeological mitigation included:

- Watching brief during the construction of the GI site compound
- Watching brief during the construction of a total length of 2.4km of haul road (separated into shorter lengths to provide access to individual plots and survey areas)
- Watching brief during the excavation of inspection pits for 58 GI borehole drilling positions
- Watching brief during the excavation of inspection pits for 13 Field Vibration Testing positions
- Watching brief during the excavation of 13 test pits targeting *Fugro Aperio Limited* geophysical anomalies
- Watching brief during the excavation of 6 GI trial pits
- Strip/Map/Sample in advance of 18 GI Seismic Hazard Observation Trenches

The locations of these works can be found on Figure 1.

Client methodologies for the key GI programme elements are individually described below followed by the watching brief results (para. 4.0).

All GI works were completed by sub-contractors employed by *Horizon Nuclear Power.*

To aid description existing field plots were individually numbered alphanumerically, starting from F1 (see Figure 1).

## 4.0 GROUND INVESTIGATION PROGRAMME

### 4.1 Watching brief - GI site compound

*4.1.1 Description*

A central compound was commissioned at the start of the GI programme for welfare and co-ordination purposes. This compound utilised a pre-existing compound, *c.*30m x 45m (1350m$^2$) in size, located in field F9 adjacent to the main access road to the existing power station. This compound was expanded by 2135m² to accommodate the infrastructure required for this phase of GI works (see Figure 1; Plate 1).

An archaeological watching brief was conducted throughout the construction of the additional compound area. Initially the topsoil was stripped using a 360° 210 tracked excavator and a 9 tonne dumper truck. The depth of this excavation was on average 0.25m. As this work revealed no archaeological deposits, further excavation was carried out in places in order to create a more level surface. The area was then covered with a membrane and filled in with stone.

*4.1.2 Results*

The construction of the site compound predominantly involved the stripping back of the topsoil, although in places the excavations went deeper, and areas of mixed glacial deposits and bedrock were exposed. No archaeological remains were identified during the watching brief. There is limited potential for archaeological remains still to lie within the stripped area as the entire area was not stripped down to the underlying glacial deposits. However, the potential for surviving archaeology remains is considered very low given the paucity of results in this and other locations monitored.

A watching brief was also undertaken during the excavation of two service trenches in the compound area. The first ran from the former Simdde Wen Lodge (GAT Report **842** Feature 20; NGR SH35499312), to the eastern corner of the compound, and was 37.0m in length, 0.8m in width (c. 30m$^2$), and 0.75m deep. No archaeology was observed during this excavation and no damage was done to the boundary wall surrounding the Lodge. The second trench was excavated across the entrance of the compound and was some 6.0m long, 0.5m wide (c. 3m$^2$) and 0.3m deep and again no archaeology was observed.

## 4.2 Watching brief - Haul Roads

*4.2.1 Description*

A network of haul roads were excavated throughout the GI zone by *Horizon Nuclear Power* to access individual field plots and survey areas (Figure 1; Plate 2). The total length of the haul road route measured c. 2.1km, although individual lengths varied. The main portion of the route was circular in shape, running from the GI site compound in field F9, through fields F78, F10, F80, F7, F5, F4, F3, F56, F1, F8 and back into the GI site compound, with numerous spurs extending out from this to borehole positions. Several shorter routes were also excavated in the area to the east of Wylfa A.

Haul roads were also located to the north east of the existing power station, however these were constructed using temporary roadway panels and were non-intrusive (total length *c.*300m).

The haul road trenches varied between 3.0m and 4.0m in width, although in places they were wider in order to allow for vehicles passing and turning. The total excavated area was approximately 8,400m$^2$. The average depth was around 0.3m. The trenches were excavated using a 360° tracked excavator, and the spoil was built up along the sides in bunds. The trenches were then lined with a membrane and filled with stone.

The archaeological watching brief was completed during the excavation of the routes: all exposed deposits were monitored, and any features or wall breaches were recorded. In instances where known archaeology was present, for example Cae'r Brenin (GAT Report **842** Feature 9; NGR **SH35459315**; a small holding shown on the tithe map of 1842), located in field F9, the route of the intended haul road was diverted in order to avoid the site

*4.2.2 Results*

The excavation of the 2.1km of intrusive haul road in places revealed areas of mixed glacial deposits and bedrock, but for the most part involved the removal of the topsoil only, leaving the ploughsoil in place. Therefore, as with the compound area, the potential for surviving archaeology remains.

The identified archaeological activity was limited mainly to nineteenth century redundant boundary walls and drainage systems: an examination of the 1$^{st}$ to 3$^{rd}$ Edition (Figures 3 and 4) Ordnance Survey Map of the area (from 1889 to 1914; Figures 3 and 4) confirmed that the majority of the redundant boundary walls were identified from this period, particularly in fields F01 (Plates 11 to 14), F04 and F08. A series of intercutting field drains associated with the nineteenth century field systems were, observed in F10 (Features 5 (Plates 17 and 18), 6 and 7; q.v. Appendix I & Figure 1) and a single field drain (Feature 10; q.v. Appendix I) was also exposed in F1 (Figure 1)

The haul road breached existing boundary walls, and widened existing gateways on numerous occasions across the site. These breaches allowed for an examination of the internal construction of the walls. The majority of the recorded walls were in a fairly dilapidated state, with considerable tumble around them, and in some places vegetation or even grass was growing over the top. The majority of the walls were all

of a fairly similar construction, built of poorly sorted sub angular and sub rounded stone. The stone was almost entirely phyllite, the same as the bedrock observed across the site, and thus most likely the result of field clearance. The majority of the walls appeared to have been constructed using a single skin technique.

The exception to this was the pair of walls (Feature 31; q.v. Appendix I) running either side of a road, running northwest out of Tregele village. These walls were of a much more substantial nature, with evidence of a double skin construction, with a core of smaller stones at the centre. There were remnants of stock proofing running along the top of the walls. These are likely to be of a 20th century date.

The haul road trenches in F1 showed clearly the extent of the heavily disturbed area to the immediate south of Wylfa A. The exposed deposits contained large quantities of stone and building waste, along with fragments of wood, metal and glass. Examples of *in situ* features in the form of concrete pads were also exposed.

### 4.3 Watching brief - inspection pits for 58 GI borehole drilling positions

#### *4.3.1 Description*

In advance of the drilling of each GI borehole (located in Figure 1; Plate 3), an inspection pit was excavated to a mean depth of 1.20m to check for local services and other hazards as well as for logging the upper soil deposits.

For the most part the inspection pits were dug by hand, although in cases where the ground deposits were very compacted a machine with a small bucket was used. The pits were on average between 0.3m and 0.4m in diameter.

The archaeological watching brief monitored 58 inspection pits; the remainder were located within areas with a risk of hazardous waste and were not monitored by GAT. As these areas of higher risk were already proven to be heavily disturbed, the potential for the survival of archaeological deposits was minimal.

#### *4.3.2 Results*

No evidence of archaeological activity was identified within any of the 58 borehole inspection pits. Ten of the pits monitored did however show evidence of re-instated or made ground, mostly within field F1 (Figure 1). The conditions for identifying archaeology were not ideal as the very confined nature of the pits meant that more ephemeral features may not have been visible.

### 4.4 Watching brief - 13 Field Vibration Testing positions

#### *4.4.1 Description*

As part of the GI works, two Field Vibration Tests were carried out on the northern and southern sides of Wylfa A (fields F54 and F4/1; Figure 1; Plate 4). Each test site required 7 monitoring points, with inspection pits excavated in advance. The inspection pits were hand excavated to a depth of 0.2m and were 0.8m x 0.8m in area.

An archaeological watching brief was completed during the excavations of 13 of the 14 inspection pits, as the fourth monitoring point in the first array of FVT1 was situated within an asbestos zone.

*4.4.2 Results*

The monitored inspection pits did not provide a significant contribution of information, due to their shallow depth of only 0.2m. Added to this, one of the monitoring points for FVT1 was situated within the disturbed area in F1, whilst one of the points for FVT2 was located directly over an outcrop of bedrock, which negated the need for any excavation.

**4.5 Watching brief - test pits targeting Fugro Aperio Limited geophysical anomalies**

*4.5.1 Description*

As part of the GI scheme, Horizon Nuclear Power completed a Vertical Magnetic Gradiometry (VMD) survey across the proposed development zone, using a pair of Caesium vapour magnetometers to identify below ground anomalies (Figure 5). A total of 146 anomalies were identified by the VMD survey; which were subsequently interpreted by GAT (GAT Report **987**/Appendix I).

Specific anomalies were targeted by *Fugro Aperio*; a total of 36 test pits were excavated by *Fugro Aperio* (primarily for buried services; Figure 5) and GAT was commissioned by *Horizon / Fugro Aperio* to supervise 12 of these pits (TP-61A, TP-62A, TP-76A, TP-16A, TP-15B, TP-22A, TP-22B, TP-62B, TP-78B and subsequently TP-76B) as part of the archaeological watching brief (Appendix II).

The test pits were hand dug to a maximum depth of 1.2m, with a maximum length and width of 1.0m and 0.9m, respectively. As soon as the cause of the anomaly was identified, excavation was halted.

*4.5.2 Results*

Of the 12 trenches located to target potential archaeological anomalies only five produced any results. Of these five, the most interesting results were two deposits of fire cracked stones surrounded by black charcoal rich material (Features 16 (Plate 09) and 17; Appendix I) observed in test pits TP-62A and TP-76 B (Fields F62 and F76 respectively). These two features have been provisionally identified as burnt mounds. The remnants of a boundary wall (Feature 18; Appendix I, Figure 1) was identified in TP15B (Field F15), lying below the topsoil (Plate 10). An examination of historical mapping, viz., the 1st and 3rd Edition (Figures 3 and 4) Ordnance Survey Map of the area confirmed that trapezoidal field F15 was historically sub-divided into two plots; the anomaly/test pit was located atop the former division separating the two northernmost plots and Feature 18 was most likely part of this boundary, which is of nineteenth century origin.

An anomaly identified immediately within the entrance to field F20, where the ground sloped fairly steeply up to the west was targeted by TP-20 (Figure 5). The excavation revealed a thick deposit of modern hard core, likely to have been laid in order to facilitate access to the field. The final anomaly, targeted by TP54B was located against a modern hedge line in field F54 (Figure 5). Excavation revealed a deposit of re-instated ground containing a significant quantity of modern waste, including large pieces of metal work which appeared to be the remnants of a gate or fence. Neither of these features will require further investigation.

### 4.6 Watching brief during the excavation of GI trial pits

*4.6.1. Description*

A total of 9 GI trial pits were excavated, predominantly in the areas to the east and northeast of Wylfa A (Figure 1; Plate 5; Appendix III). The trial pits targeted areas of potentially disturbed and re-instated ground and ranged from 3m – 4.5m in depth, 2.5m – 4.5m in length and 1.6m in width. They were excavated using an 8 tonne tracked excavator. A 1.6m wide ditching bucket was used to remove the upper deposits, and then a narrower toothed bucket was used to remove the lower natural (glacial) deposits.

Four of the pits were clustered in an area immediately to the north-east of Wylfa A, in a heavily disturbed area. Having observed the excavation of the first trial pit in this area, it was deemed unnecessary to maintain an archaeological presence, due to the depth of the reinstated material. Consequently, only 5 trial pits (including the pit mentioned above) were subject to an archaeological watching brief. These covered a total of 55.21m$^2$.

*4.6.2. Results*

The GI trial pits targeted the areas immediately surrounding Wylfa A and the visitor centre, where the highest levels of past disturbance were expected. As predicted these trial pits did not reveal any archaeology, they did however contribute to our understanding of the nature and extent of the disturbance associated with the construction of Wylfa A.

A cluster of four GI trial pits (TP577, TP578, TP579 and TP580), were focused in the area to the immediate north-east of Wylfa A, in field F52 (Figure 1). They revealed a thin deposit of topsoil overlying a compact deposit of made ground which contained frequent gravel and cobbles of blue-grey phyllite, and was some 2.1m in depth. Only one of these pits was monitored.

A further two GI trial pits were located in the landscaped areas to the east and west of the visitor centre (TP574 and TP575). These revealed comparatively shallow deposits of made ground, less than 1.0m in depth. The deposits observed in the pit on the western side of the visitor centre (TP574) contained hard core material, including bricks and wood, overlying the natural glacial deposits.

A further three GI trial pits were distributed across field F9 (Figure 1). The first, TP571, was located west of the compound on rough sloping ground. This trial pit revealed a shallow deposit of topsoil overlying a deposit of very compact, dark brown silt containing frequent patches of grey and yellow silt and cobbles some 3.9m thick. This deposit was classified as ‘possible made ground’ by the attending engineer. The second trial pit excavated in F9 (TP572), located south-west of the compound in low boggy ground, did not reveal any made ground, or evidence of disturbance. The final trial pit (TP573) located fairly close to the remnants of Simdde Wen, in an area of low boggy ground in field F9 revealed several thin deposits of made ground underlying the topsoil and plough soil. The first of these was a compact/friable clay-silt containing moderately frequent stone inclusions and occasional bricks, some 0.2m thick. This deposit overly a second made ground layer of compact/friable, dark brown-grey sand-silt with moderately frequent stone inclusions. This in turn overlay a deposit of natural boulder clay.

### 4.7 Strip / Map / Sample in advance of GI Seismic Hazard Observation Trenches

*4.7.1 Description*

A total of 17 Seismic Hazard Investigation Observation Trenches were excavated, all located in the area to the south of Wylfa A (Figure 1; Plates 7 and 8; Appendix IV). The location of these trenches was informed by a geophysical survey of the rock interface completed for *Horizon Nuclear Power*. The initial dimensions of the observation trenches averaged 10m x 30m, although individual trenches were expanded, in response to the geology found. As a result there was considerable variation in the overall dimensions of the trenches.

The upper deposits of each trench were excavated using a strip / map / sample technique by the archaeological contractor, in order to closely assess the potential for the preservation of archaeological material. Once the trench area was reduced down to natural glacial deposits or bedrock it was signed off and handed over to the GI team. In instances where the trench had to be extended the archaeological contractor was called back in and the strip / map / sample technique was continued. In total *c.*4,635.95m$^2$ was archaeological assessed.

A further six observation trenches (OT501, OT502, OT502A, OT502B, OT503 and OT503B) were excavated in the heavily disturbed area immediately south of Wylfa A, within field F1, and were specifically targeting the valve chamber visible from the surface. The aim was to establish the extent of the chamber and the location of the pipes running into it. These observation trenches were a similar size to the GI trial pits, and were excavated in a similar style. No archaeological supervision of these trenches was undertaken.

*4.7.2 Results*

The majority of the Seismic Hazard Observation Trenches (9 in total) were located in field F56, a field to the south of Wylfa A, outside of the disturbed area and bordered by the coast on its western side (Figure 1). Excavation here revealed fairly sandy topsoil, on average 0.15m thick and a similarly sandy plough soil which was up to 0.45m in depth, overlying a natural glacial deposit of firm mid orange-brown silt-clay, with outcrops of fractured phyllite bedrock showing through in places.

The majority of the archaeological features identified within the Seismic Hazard Observation Trenches were associated with land drainage, and ranged from fairly modern ceramic pipes, to a small stone built culvert (Feature 19 (Plates 15 and 16); Appendix I, Figure 1). Other common features were tree bowls of varying size, often containing charcoal. These are likely to be evidence of gorse burning.

Five possible backfilled trenches, apparently dating back to an earlier phase of GI works were identified within a number of the trenches (OT604A & B, OT611A, OT612A, OT612 & OT612A, OT618 and OT621). These trenches were not fully exposed, but appeared to vary in size, with the largest over 6.0m wide. It is probable that these test pits were targeting the same geological features, as the present observation trenches. The depth of these trenches removed all possibility of archaeology surviving in those locations.

The final trench OT621 was termed a Verification Trench, and its specific aim was to locate one of the trenches from the earlier phase of GI works in field F1. This

backfilled trench was identified running east-west, it appeared to be approximately 7.0m in width, and 17.0m in length. The made ground, associated with the construction of Wylfa A extended some 17.0m into the OT from the eastern end, leaving only 2 relatively small areas of undisturbed ground in the NW and SW corners. No archaeology was observed in these areas.

Overall, within the *c.*4,635.95m$^2$ of strip/map/sample no significant archaeological remains were identified.

## 6 INTERPRETATION AND CONCLUSIONS

### 6.1 Archaeological evidence

#### *6.1.1 Prehistoric Activity*

The deposits of fire cracked stones surrounded by black charcoal-rich material (Features 16 and 17; Appendix I) observed in TP-62A and TP-76 B respectively are probable 'burnt mounds'. The majority of these sites are of Bronze Age date, thus they represent the first significant evidence of prehistoric activity within the study area.

The focus of burnt mound sites tended to be a trough or pit associated with a hearth, and occasionally some sort of small structure. The trough would be filled with water, occasionally by diverting water through a small channel from a nearby water source, or by allowing it to fill up gradually with ground water. Stones would be heated in the hearth and then manoeuvred into the trough, thus heating the water. This process would cause the stones to crack, so following each episode of use the heat effected stones and associated charcoal would be shovelled out of the trough, and piled up around the sides, thus forming the so called 'burnt mound'. Although no hearth or trough was observed within the test pit, full excavation of this site may produce evidence of such features.
No other evidence of prehistoric activity was observed in any of the other locations.

#### *6.1.2 Post medieval Activity*

All of the remaining archaeological features identified during the this programme of works relate to the 19th century ; for example, the network of boundary walls and field drainage systems, along with the burnt out-tree bowls indicating gorse control, and the fairly even distribution of post medieval pot within the upper deposits indicate the extent of post-medieval land management. The features were identified across a wide area, either side of Cemlyn Road.

The majority of these features were located within the fields to the south of Wylfa A and most were identified in the haul roads and the observation trenches. Features 1, 2, 3, 4, 8 and 15 (redundant boundary walls) were identified within Fields F01, F03, F08, F56 and F80 (Figure 1). The historic mapping, viz., the 1st and 3rd Edition (Figures 3 and 4) Ordnance Survey Map confirmed most were part the field system associated with *Tai Hirion* Farm and *Pen Pistyll* Farm.

Redundant boundary walls were also identified during the haul road watching brief in Field F32 (Feature 11) and the test pit watching brief of test pit TP-15B in Field F15 (Feature 18), towards the eastern extent of the scheme. Feature 11 was identified on the historic mapping, as a wall sub-dividing into two plots; the haul road cut through

this former division. Feature 18 was a boundary that historically sub-divided Field F15 was into two plots.

A series of field drains (Features 5, 6 and 7) were also located in Field F10; an examination of historical mapping (Figures 3 and 4) suggested these drains were located within an improved field system north of *The Firs* Estate Farm.

The majority of the identified were not extant on the VMD survey results (Figure 5), except for Features 16, 17 and 18 (field boundaries). The field drains were not identified on the VMD survey, nor were the boundaries in Fields F01, F03, F08, F56 and F80. It is expected that further evidence for post-medieval drainage could be found across the development zone.

### 6.2 Previous ground disturbance associated with Wylfa A

#### *6.2.1 Heavily disturbed ground to the north and south of Wylfa A*

GI excavations in the areas to the immediate north and south of Wylfa A showed clear evidence of heavy disturbance. In field F1, to the south of Wylfa A, the upper deposits were characterised by frequent inclusions of industrial waste, including fragments of wood, metal and glass (Figure 01; Plates 23 and 24). In places this re-instated ground was shown to be over 3.0m in depth. The *in situ* features such as the concrete pads and subterranean tanks indicate the location of the main construction compound for Wylfa A in the northern part of F1 (Plate 23). This area is now covered by a fairly thin layer of topsoil, and turf and is used for grazing; however no efforts have been made to landscape it as such.

GI trial trenching to the immediate north-east of Wylfa A in field F52 (Figure 01) revealed compact stony deposits, over 2m in depth, identified as re-instated ground, overlying the natural glacial deposits. Both these areas of activity may be confidently attributed to the construction of the Wylfa A in the 1960s. The potential for the survival of archaeological deposits within F01 and F52 is very low.

Figures 1 and 5 locate the extent of disturbance associated with the construction of Wylfa, with the information based on site observations during the GI works as well as aerial photographs from the Wylfa A construction phase. The majority of the GI works was completed outside of this area, in the fields to the immediate south. The VMD Survey (Figure 5) also identified anomalies associated with the construction phase, particularly in Fields F01, F02 and F09.

#### *6.2.2 Landscaped areas to the east of Wylfa A*

As indicated in the archaeological assessment (GAT Report **842**: 17), the area to the east of Wylfa A, shows clear evidence of landscaping. This area includes the visitor centre, its associated car park and grounds, the sports field and areas of woodland. The number of GI trials in this area were limited, however the work that was done indicates relatively shallow deposits of made ground, sometimes including hard core material, generally under 1m in depth, overlying the natural glacial deposits. Although the level of disturbance is considerably less intrusive than in the areas to the north and south of Wylfa A, the potential for the survival of archaeology is still fairly low here.

### 6.3 General Conclusions

The intrusive GI works were mainly concentrated within a 50ha zone to the immediate south of Wylfa A. An approximate total of 1.32ha was excavated across this zone as well as a small number of test pits and boreholes to the east and northeast of Wylfa A. The 50ha main GI zone incorporated all of the seismic hazard observation trenches and the haul roads. These two GI elements produced the greatest number of features, all of which were deemed to be of nineteenth century origin, with redundant boundaries extant on historic map evidence; evidence for the construction impact for Wylfa A was identified both within the trial pits and seismic trenches, as well as the VMD survey. Signficant archaeology was limited to two possible Bronze Age burnt mounds located towards the southern end of the 50ha main GI zone; these were identified during trial pitting of VMD survey anomalies. No evidence for similar activity was identified elsewhere in the main GI zone or the fringe GI areas to the east/northeast, during the watching brief.

The results of the GI watching brief confirmed the extent of post-medieval land management and the construction impact of Wylfa A.

## 7 SOURCES CONSULTED

Davidson, A., 2010. Gwynedd Archaeological Trust Report **842**. Proposed Nuclear Power Station at Wylfa, Anglesey, North Wales: *Archaeological & Cultural Heritage Baseline Assessment Report***.** May 2010

Fugro Aperio Ltd drawing 3652-11B

Hopewell, D. 2011 Gwynedd Archaeological Trust Report **987**. *PROPOSED NUCLEAR POWER STATION, WYLFA YNYS MÔN ARCHAEOLOGICAL EVALUATION*: Targeted Geophysics (G2096). October 2011

Horizon Nuclear Power drawings TQHOWA/001 & TQHOWA/003

Structural Soils Limited Exploratory Hole Location Plan: Figure 2

Wylfa New Build: Intermediate Ground Investigation Scope data

## APPENDIX I

**List of archaeological features identified during the Ground Investigation Works watching brief.**

*Note. All features are located via the alphanumeric filed location system (except for Features 16 and 17, which are also located via NGR co-ordinates) For the location of individual features cf. Figure 1 and Figure 5.*

***1. Boundary Wall (F8/F1)***
A 4m long section of upstanding dry stone wall running east-west within the gateway between F8/F1, identified during the excavation of the haul road route through this area. The wall was approximately 0.8m in height and 0.5m in width, and was constructed of large sub-angular stones of local phyllite, up to 0.5m in diameter. This feature appeared to have been part of a wider system of field boundaries; an examination of historical mapping, viz., the 1st and 3rd Edition (Figures 3 and 4) Ordnance Survey Map of the area suggests this feature was associated with *Tai Hirion* Farm; an examination of the 1820s Ordnance Survey Map (Figure 2) of the same area does not identify any further detail.

The wall was photographed before & after vegetation removal, and a written description was made. This feature was then removed entirely *within the confines of the haul road*.

***2. Boundary wall (F1)***
An upstanding dry stone boundary wall, running north-south through F1, identified during the excavation of the haul road route through this area. The wall was constructed of sub-angular blue grey phyllite and stood some 0.5m high. A pile of stones, somewhat overgrown was observed on its eastern side adjacent to the gateway at the southern limit of the wall. Although still standing this wall was in a dilapidated and overgrown condition, with a significant quantity of tumble visible on either side and was no longer in use. This feature is likely to have been part of a wider system of field boundaries, all of a similar construction, which extend across most of the site. The northern limit of this wall marks the start of the disturbed ground to the south of Wylfa A.

An examination of historical mapping, viz., the 1st and 3rd Edition (Figures 3 and 4) Ordnance Survey Map of the area suggests this feature was part of a field system located between *Tai Hirion* Farm and *Pen Pistyll* Farm.

An east-west running haul road passed through the entrance at the southern end, and a small quantity of stone was removed in order to widen the gap, otherwise preserved in situ. A photographic and written record was kept.

***3. Boundary wall (F1)***
An "L" shaped section of dry stone wall within F1. The north-west/south-east side of the “L” was 30m in length and the north-east/south-west side was 10m in length. Although still standing this wall was in a dilapidated and overgrown condition, with a significant quantity of tumble visible on either side and was no longer in use.

A 1m wide section of the wall was cleaned running north-east/south-west across the feature. The turf and topsoil were removed in order to reveal the features full extent, and then the loose tumble was removed from either side in order to reveal the original dimensions. The wall was revealed to be 0.7m in height and 0.9m in width. It was constructed from a mix of sub-angular and sub-rounded phyllite stones, up to

0.6m in diameter. The wall did not appear to have been constructed within a foundation cut. A 3m wide haul road trench was then excavated by machine through the wall, and the exposed cross-sections were recorded. This wall was otherwise preserved in situ. A photographic and written record was kept throughout.

An examination of historical mapping, viz., the 1st and 3rd Edition (Figures 3 and 4) Ordnance Survey Map of the area suggests this feature was part of a field system located between *Tai Hirion* Farm and *Pen Pistyll* Farm.

***4. Boundary Wall (F1/F4)***

An upstanding dry stone wall, running east-west between F1/F4. Approximately 0.7m in height and 0.8m in width, constructed from a mix of sub-angular and sub-rounded phyllite stones, up to 0.75m in diameter. Although still in use, this feature has been re-enforced by a modern fence, and is likely to be part of a wider system of early field boundaries, all of a similar construction, which extend across most of the site.

An examination of historical mapping, viz., the 1st and 3rd Edition (Figures 3 and 4) Ordnance Survey Map of the area suggests this feature was part of a field system located between *Tai Hirion* Farm and *Tan yr Allt* Farm.

This wall was breached in two places by 3m wide haul road trenches. A photographic and written record was kept.

***5. Field Drain (F10)***

A 22.0m long curvilinear feature, approximately 0.3m wide and 0.1m deep observed in the haul road trench in F10. It contained a single deposit of sub angular stones >0.2m in diameter. This feature continued out of the area of excavation at either end, therefore its total length is unknown. Approximately 10.0m from the southern end, branched off to the east and west, creating a cross-like effect. These off-shoots, were of an identical construction to the main linear, and appear to be contemporary – one does not appear to cut across the other. It is probable that these features are part of a system of drainage ditches, although they are somewhat shallower than would be expected.

This feature was cleaned by hand, and a narrow investigative slot was cut across its length. A photographic and written record was kept. The feature has been preserved in situ, covered by the membrane and stone for the haul road.

***6. Field Drain (F10)***

A north-west/south-east running field drain, 5.0m in length, 0.4m in width and 0.2m deep, observed in the haul road trench in F10. This feature contained a single deposit of sub-angular stones up to 0.25 diameter. Around the sides of the cut the stones appeared to have been placed with some care, forming a rough lining. However due to the large quantity of water still flowing through this feature it was impossible to view its construction clearly. The north-eastern end of this feature ran of the edge of excavation, whilst at its south western end the feature terminated within the trench. This field drain was located 2.5m to the north of *feature 5*, the two were of a similar construction, although *feature 6* was slightly more substantial.

An examination of historical mapping, viz., the 1st and 3rd Edition (Figures 3 and 4) Ordnance Survey Map of the area suggests this feature was located within an improved field system north of *The Firs* Estate Farm.

This feature was cleaned by hand, and a narrow investigative slot was cut across its length. A photographic and written record was kept. The feature has been preserved in situ, covered by the membrane and stone for the haul road.

***7. Field Drain (F10)***

A modern field drain running north-east/south-west observed in the haul road trench in F10. The feature was 0.4m wide and 0.15m deep, 3m of the feature were visible within the trench, but its overall length is unknown. The cut had straight sides and a flat base, and contained a single mid brown-yellow sand-silt deposit. This linear clearly cut across the southern end of *feature 5.* It's very straight sides indicate it may have been dug using a machine, and is therefore likely to be significantly later than the other features in this area.

An examination of historical mapping, viz., the 1st and 3rd Edition (Figures 3 and 4) Ordnance Survey Map of the area suggests this feature was located within an improved field system north of *The Firs* Estate Farm.

This feature was cleaned by hand, and a narrow investigative slot was cut across its length. A photographic and written record was kept. The feature has been preserved in situ, covered by the membrane and stone for the haul road.

***8. Boundary Wall (*F56/F3)**

An upstanding dry stone boundary wall, running east/west between F56/F3. This feature was constructed predominantly of flat, sub-angular, purplish stones (phyllite), and was approximately 0.5m wide and 1m high.

An examination of historical mapping, viz., the 1st and 3rd Edition (Figures 3 and 4) Ordnance Survey Map of the area identifies this wall as part of an improved field system.

This wall was breached on four separate occasions as part of the GI works. A 3m wide section was removed during the excavation of OT611 and a further 5m were removed during the excavation of OT611B. A 6m wide haul road trench was also cut through this feature, and a second passed through an apparent gap , although the large quantity of stone below the surface indicated that this was not an original entrance way. A photographic and written record was kept.

***9. Remnants of fairly modern structure/imported hardcore***

A cluster of features were observed within the wooded area to the west of the visitor centre. These included a brick pad, approximately 1m x 2m, which was visible on the surface, although not apparently in situ. A cluster of large boulders was also visible some 5m to the west of this. The excavation of TP574 revealed a rubble deposit containing brick, wood and stone located below the subsoil. It is probable that all these features are associated with the intensive phase of landscaping which was undertaken after the construction of Wylfa A, and are either remnants of a fairly modern structure, perhaps associated with Wylfa A, or are imported hardcore.

Aside from the portion of rubble deposit removed during the excavation of TP574, these features were all preserved in situ. A photographic and written record was kept throughout.

***10. Field Drain (F1)***

Field drain - north-west/south-east running, 4.0m x 0.4m, 0.08m in depth, concave base, single fill: soft, mid grey-brown, silt-clay with frequent sub angular stones <0.2m in diameter. observed within haul road trench. 0.5m slot excavated by hand, Preserved *in situ* - covered with membrane & stone for the haul road F1

***11. Boundary Wall (F32)***
A band of stony material was observed running north-east/south-west across the haul road trench running north-west across F32 identified during the excavation of the haul road route through this area. The feature was located some 70.0m north-west from the gateway into F32. The deposit was 2.0m in width and consisted of angular stones >0.3m in diameter of blue-grey phyllite. Occasional fragments of post-medieval pot were also noted within this deposit. The robbing out of reusable stone and the effects of ploughing have resulted in a very dispersed, non structural deposit.

An examination of historical mapping, viz., the 1st and 3rd Edition (Figures 3 and 4) Ordnance Survey Map of the area confirmed that trapezoidal field F32 was historically sub-divided into two plots; the haul road cut through the former division.

***12. Test pit (F3)***
A large rectangular feature, some 6m in width and a minimum of 17m in length running east/west. It was observed within OT612, and in OT612A, and is likely to be a test pit from an earlier phase of ground investigations, targeting the same geological faults.

A photographic and written record was kept throughout.

***13. Tree bowl (F56)***
An area of intense burning, with a very irregular cut, containing a single deposit of soft, patchy orange/black/grey-brown, sand-clay-silt, with inclusions of charcoal lumps and flecks. Located in the southern corner of OT604. Most likely a small burnt out tree bowl, most likely gorse.

The portion of the feature visible within the trench was excavated by hand, and the area was then taken down further by machine. The rest of the feature, outside the trench survives in situ. Half sectioned, photographed, sketch drawing.

***14. Void***

***15. Boundary Wall (F80)***

This feature was identified during the excavation of a section of haul road, running north-west across F80 (Figure 1). The feature comprised a northeast/southwest running dry-stone boundary wall. Max proven height: 0.6m, width 3.5m. Constructed of large sub-rounded/sub-angular stone (<0.6m) of a predominantly blue-grey phyllite.

An existing gateway in this wall was also widened at this point by approximately 0.5m to allow a haul road trench to pass through. The exposed section was cleaned up and recorded. The continuation of stone along the line of the wall, below the topsoil indicates that this gateway was not original.

An examination of historical mapping, viz., the 1st and 3rd Edition (Figures 3 and 4) Ordnance Survey Map of the area confirmed that trapezoidal field F80 was historically sub-divided into four plots; the haul road cut through the former division separating the two northernmost plots.

***16. Burnt Mound*** (F76/NGR SH35179283)

A 0.8m thick deposit of friable black, clay-silt-charcoal matrix surrounding fire cracked and reddened stones <0.1m in diameter. Located below the topsoil and above the natural. The feature is located on ground which slopes down to a boggy area to the south.

Test pit, TP-76B (FUGRO) 1.1m in depth and 0.3m and 0.4m diameter was excavated through the feature. A sample was taken of the burnt material, and a written and photograph record was made of the exposed section. The rest of the feature survives *in situ*

***17. Burnt Mound*** (F62/NGR SH34629263)
A compact, black deposit of clay-silt-charcoal matrix surrounding fire cracked and reddened stones <0.05m in diameter. The feature is located on a hillside sloping down to the SE.

A test pit, TP-62A (Fugro) 0.5m in depth, and 0.0.3m x 0.37m in diameter, was excavated down to the top of the burnt mound material, but then stopped. A written and photographic record was made. The feature was preserved in situ.

**18. *Probable Boundary Wall (*F15)**
A short section of an east-west running linear was revealed within *Fugro Aperio* Test Pit TP-15B (NGR SH35959304). The feature was formed of sub-rounded stone <0.25m in diameter, it was apparently only one course wide and one course high. No cut was visible. The feature was located below the topsoil.

A test pit 1.1m x 0.4m was excavated in order to identify an anomaly observed on the geophysical results. The test pit was excavated down to the top of the feature, and this was cleaned off by hand. A photographic and written record were kept. The feature survives in its entirety

An examination of historical mapping, viz., the 1st and 3rd Edition (Figures 3 and 4) Ordnance Survey Map of the area confirmed that trapezoidal field F15 was historically sub-divided into two plots; the anomaly/test pit was located atop the former division separating the two northernmost plots and Feature 18 was most likely part of this boundary.

***19. Stone built culvert*** **(F56)**

A stone linear feature, running nnw-sse across the se end of OT603 (Figure 1). The feature was 0.5m in width, and the max proven length was 8.6m. The cap stones were sub angular slabs of purple and blue-grey phyllite, approximately 0.5m in width and up to 0.7m in length. The capstones rested on parallel stone walls, both 0.15m wide and 0.15m high, constructed of 3-4 courses of sub-angular phyllite stones (dry stone construction.) These walls allowed for a channel 0.25m in height and 0.25 in width. This feature did not have a base, however the natural into which it was cut was compact and stony. The channel was partially silted up by a 0.04m thigh deposit of gravel, below a 0.02m thick deposit of sandy silt. The feature runs through a natural valley between to small hills, and appears to run off the edge of a coastal cliff.

The top of the feature was exposed in plan by the machine, and then cleaned up by hand and photographed in sections. A cap stone was then removed, and the interior of the structure was photographed. A wide slot was then cut using the machine, and the exposed face was again cleaned up by hand, photographed and a detailed written description was made. The 8.6m of the feature within the OT were removed

entirely, however the feature appeared to continue outside the trench in both directions, thus some of this feature still survives in situ.

***20. Tree Bowl (F56)***
Part of a large sub-circular feature (approximately 25%), was observed in the western corner of OT602B. The fill was a soft, patchy mid cream/orange, silt-clay containing occasional poorly sorted cobbles <0.4m in diameter. The edges of the deposit were very diffuse, and the colour of the surrounding natural had a leached-out appearance.

The portion of the feature within the trench was cleaned and photographed, and then a 0.4m wide slot was dug along the south-west facing side of the trench. Sketch sections along with a written and photographic were made. The portion of the feature within the trench (approximately 25%) was removed following recording, however the rest of the feature survives in situ.

***21. Tree Bowls (F3)***
A series of 5 small (<0.5m in diameter) burnt patches were observed running in a rough east/west line across the trench. They contained a soft, dark black-brown, silt-clay, containing frequent flecks and small pieces of charcoal and occasional cobbles. These features are most likely small burnt out tree bowls, most likely gorse, possibly remnants of a hedge line.

One of the burnt patches was cleaned up by hand and photographed and a box section was cut across it. A written and photographic record was made. These features do not survive.

***22. Tree Bowl (F56)***
A fairly large burnt feature identified within OT611B. It was 3.0m x 2.0m, with a depth of 0.15m. It consisted of a soft patchy dark brown/black sand-silt-clay containing occasional cobbles and concentrated patches of charcoal, within a shallow, very irregular cut. The edges of the deposit were very diffuse. Most likely a tree bowl.

The feature was cleaned by hand, photographed, half sectioned, and a sketch section was made along with further photographs and a written description. The feature is likely to be destroyed.

***23. Field Drains (F3)***
A series of 4 parallel linear features running north-east/south-west across OT615, spaced approximately 5m apart and this showed a cut with a sharp break of slope, vertical sides, and a flat base. It was 0.3m wide and 0.35m in depth. The feature contained a single fill consisting of a soft, mid brown, silt-clay matrix surrounding mixed sub-rounded cobbles (beach pebbles). The other three features appeared to be of a very similar construction. They are most likely field drains, their regular nature implies they have been excavated using a machine, and are thus of a modern date.

A 0.5m wide slot was excavated across one of the features and the section was recorded using sketches and photographs. The portion of the ditches within the trench are likely to be destroyed, however the features appear to continue outside of the trench - to the northeast and southwest.

***24. Tree Bowl (F3)***
A shallow sub-circular feature containing a charcoal rich fill observed within OT615. The cut had irregularly sloping sides and a very uneven base. The feature was 0.5m x 0.55m in diameter and had a max depth of 0.13m. The fill was a firm, dark brown,

silt-clay containing moderately frequent flecks and lumps of charcoal and gravel and occasional phyllite cobbles. The interface was fairly distinct. A probable small burnt out tree-bowl.

The feature was cleaned and half sectioned by hand and recorded using sketches and photographs. The feature is likely to have been destroyed entirely.

***25. Track (F8)***
A northeast/southwest running linear feature observed within OT622 (for the location of OT622 cf. Figure 1). The cut was 3m wide and approximately 0.3m in depth, cut into the topsoil. The cut had steeply sloping sides and a flat base. It contained a single fill of blue-grey phyllite gravel. The gravel had partially grassed over but was still visible from the surface in places. This gravel track is likely to be of a fairly modern date, and appears to be running towards *Tai Hirion* Farm.

The feature was excavated using machine, and was recorded using photographs and sketches. The portion of the track within the trench has been destroyed, however the feature appears to continue outside of the trench - to the northeast and southwest.

***26. Field Drain (F8)***
A north/south orientated linear feature, running down the middle of OT622 (for the location of OT622 cf. Figure 1). The sides of the cut sloped moderately (the western side was slightly steeper than the east) to a narrow concave base. The cut was approximately 1m wide and 0.25m in depth. The feature contained a single deposit - a soft, mid grey-brown, silt clay containing occasional gravel and cobbles. In places modern waste, including wood and plastic, were visible in the top of the fill - it is possible that these are associated with heavy wheel rutting in the area.

An exposed section was cleaned and recorded. The portion of the feature within the trench is likely to be destroyed, however the feature appears to continue outside of the trench - to the north and south.

***27. Possible Field Drain (F8)***
A small, shallow linear, some 5m in length, 0.2m in width and 0.05m in depth, running north-northeast/south-southwest within OT622 (for the location of OT622 cf. Figure 1). It contained a soft, mid grey-brown, sand-silt clay deposit with occasional gravel inclusions. This feature may be the remnants of a small field drain, however given its dimensions and the boggy nature of the ground here; it may also be a wheel rut.

A narrow slot was excavated by hand, and it was recorded using sketches and photographs. This feature has been destroyed.

***28. Tree Bowl (F8)***
A shallow irregular feature observed below the topsoil within OT622 (for the location of OT622 cf. Figure 1). It was approximately 2.7m x 1m in diameter, with a maximum depth of 0.13m. The cut had irregular sloping sides and an uneven base. It was filled by a single deposit, a firm, mid grey-brown, sand-silt-clay containing moderately frequent gravel and occasional cobbles of blue-grey phyllite. This feature is likely to have been a tree-bowl, although unlike many of the other tree-bowls observed it does not appear to have been burnt.

The feature was cleaned by hand and a 0.5m wide slot was cut across the middle of the feature. It was recorded using sketches and photographs. The feature is likely to have been destroyed.

***29. Tree Bowls (F4)***
A series of 4 sub-circular features containing burnt material located at the southern end of OT618 (for the location of OT618 cf. Figure 1). The cuts were sub-circular, with an irregular base and unevenly sloping sides. Each feature was approximately 0.4m in diameter and the excavated example was 0.09m in depth. They were filled by a single deposit of soft, mid brown silt-clay containing very frequent charcoal flecks and lumps and occasional small sub-rounded cobbles. *These features were most likely small burnt out tree-bowls, probably gorse, and may represent the remnants of a hedge line*.

The features were cleaned by hand and photographed and then one was half sectioned, and recorded using sketches and photographs. The features are likely to be destroyed.

***30. Possible Pit (F4)***
A small, sub-rounded cut feature, observed below the plough soil in OT618 (for the location of OT618 cf. Figure 1). The cut was 0.5m long and 0.35m wide and was only 0.8m deep. It had an irregular base and unevenly sloping sides, and contained a single fill of firm, mid brown, sand-silt-clay. *This feature may be the remnants of a small pit, although it may simply be a stone hole, associated with ploughing.*

This feature was cleaned by hand and half sectioned, and then recorded using sketches and photographs. It is likely to have been destroyed.

**31. Parallel Boundary Walls**
Parallel walls either side of a local road, running northwest out of Tregele village. These walls were of a much more substantial nature, with evidence of a double skin construction, with a core of smaller stones at the centre. There were remnants of stock proofing running along the top of the walls. *These are likely to be of a 20$^{th}$ century date*.

## Appendix II

## Test Pits targeting Fugro Aperio Limited geophysical anomalies monitored by Gwynedd Archaeological Trust

| Test Pit No | Location Description | Length | Width | Depth | Further Comments |
|---|---|---|---|---|---|
| TP-76B | Located on a slope which leads down to boggy ground to the south. | 0.4m | 0.3m | 1.1m | Burnt mound (Feature 16) was observed within this test pit. |
| TP-76A | Enclosed pasture sloping down to the southeast | 0.6m | 0.4m | 1.2m | No archaeology observed. |
| TP-61A | Enclosed pasture | 1m | 0.3m | 0.95m | No Archaeology observed |
| TP-62B | Southern corner of flat, enclosed pasture | 0.5m | 0.3m | 0.4m | No archaeology observed. |
| TP-62A | Located part way down a southeast facing slope within enclosed pasture. | 0.5m | 0.3m | 0.37m | Having identified the cause of the anomaly as archaeological (feature 17 - probable burnt mound), excavation was stopped. |
| TP-78B | Uneven enclosed pasture, sloping slightly to the northeast | 0.7m | 0.4m | 1.2m | No archaeology observed. |
| TP-22A | Located on a hilltop within enclosed pasture, the ground slopes slightly to the east. | 0.7m | 0.3m | 1.2m | No archaeology observed |
| TP-22B | Located on a hilltop within enclosed pasture | 0.7m | 0.3m | 1.1m | No archaeology observed |
| TP-20A | Located immediately inside entrance to large field, the ground slopes fairly steeply up to the west | 0.3m | 0.3m | 0.6m | The anomaly appears to have been caused by a thick deposit of modern hard core, likely to have been laid in order to facilitate access to the field. |

| | | | | | |
|---|---|---|---|---|---|
| TP-54B (relocated) | Located on the edge of a landscaped picnic area, immediately south of a modern fence line | 0.9m | 0.9m | 0.4m | A t-shaped trench. The anomaly was caused by made ground containing a large pieces of metal, possibly remnants of an earlier boundary, i.e. a gate or fence, this was left intact. |
| TP-15B | Located on level ground in the middle of a large field | 1.1m | 0.4m | 0.33m | Remnants of a probable boundary wall (feature 18) were identified a the cause of the anomaly. The stones of the feature were cleaned up, but not disturbed. |
| TP-16A | Located within enclosed pasture sloping to the north | 0.8m | 0.25m | 1.2m | No archaeology observed |
| TP-69A (relocated) | Located within enclosed pasture sloping to the northeast | 0.5m | 0.45m | 1m | No archaeology observed. |

## Appendix III

## Structural Soils Ground Investigation trial pits monitored by Gwynedd Archaeological Trust

(For the location of the individual test pits cf. Figure 01)

| Test pit No | Field No | Location Description | Length | Width | Further Comments |
|---|---|---|---|---|---|
| TP572 | F9 | Located south-west of the compound in low boggy ground. | 2.5m | 1.6m | No archaeology observed |
| TP573 | F9 | Located north-west of the compound in low boggy ground | 3.4m | 1.6m | No archaeology observed |
| TP571 | F9 | Located west of the compound on rough sloping ground | 3.4 | 1.6 | No archaeology observed |
| TP574 | N/A | Located to the east of the visitor centre, in a flat area, likely to have been landscaped | 3.4m | 1.6m | No archaeology observed |
| TP575 | N/A | Located to the west of the visitor centre, in a clearing in a wooded area. Again the land here is very flat and likely to have been landscaped. A brick pad, 1.35m x 2.25m, and up to 0.23m high along with a cluster of large boulders were observed in the vicinity, but these were avoided by the test pit. | 3.3m | 1.6m | No archaeology observed |
| TP580 | F52 | Located immediately to the north-east of Wylfa A in a heavily disturbed area | 4.5m | 1.6m | No archaeology observed |
| TP577 | F52 | Located immediately to the north-east of Wylfa A in a heavily disturbed area | | | Having observed the excavation of the first test pit in this area, it was deemed unnecessary to maintain an archaeological presence, due to the depth of the reinstated material. |
| TP578 | F52 | Located immediately to the north-east of Wylfa A in a heavily disturbed area | | | Having observed the excavation of the first test pit in this area, it was deemed unnecessary to maintain an archaeological presence, due to the depth of the reinstated material. |

| | | | | | |
|---|---|---|---|---|---|
| TP579 | F52 | Located immediately to the north-east of Wylfa A in a heavily disturbed area | | | Having observed the excavation of the first test pit in this area, it was deemed unnecessary to maintain an archaeological presence, due to the depth of the reinstated material. |

## Appendix IV

## Seismic Hazard Observation Trenches monitored by Gwynedd Archaeological Trust

(For the location of the individual trenches cf. Figure 01)

| Trench no | Location description | Field No | Min trench width | Max trench depth | Archaeology |
|---|---|---|---|---|---|
| OT501 | Heavily disturbed ground, immediately south of Wylfa A | F1 | 1.6m | 3.0m | 1.5m of made ground was identified below the topsoil. |
| OT502 | Located south of Wylfa A in a heavily disturbed area, this trench runs along the north side of a valve chamber visible from the surface. | F1 | 0.8m | 1m | Made ground to a maximum proven depth of 0.9m was identified below the topsoil. |
| OT502A | Located south of Wylfa A in a heavily disturbed area, this trench runs along the east side of a valve chamber visible from the surface. | F1 | 0.7m | 1.5m | 3m of made ground which included an in-situ layer of tarmac was identified below the topsoil. |
| OT502B | Located south of Wylfa A in a heavily disturbed area, this trench runs along the south side of a valve chamber visible from the surface. | F1 | 0.7m | 1.5m | 1.3m of made ground was identified below the topsoil. |
| OT503 | Located south of Wylfa A in a heavily disturbed area, this trench runs along the west side a sump/tank visible from the surface. | F1 | 1.0m | 3.5m | 2.9m of made ground which included an in-situ layer of tarmac was identified below the topsoil. |

| | | | | | |
|---|---|---|---|---|---|
| OT503A | Located south of Wylfa A in a heavily disturbed area, this trench runs along the northern side a sump/tank visible from the surface. | F1 | 1.0m | 3.0m | 1m of made ground was identified below the topsoil. |
| OT602 | Rough pasture, coastal, adjacent to lime kiln (site 2). | F56 | 2.35m | 0.45m | A land drain containing a ceramic pipe was observed running north-south across the trench. |
| OT602A | Rough pasture, coastal, adjacent to lime kiln (site 2). | F56 | 8.0m | 0.5m | Remnants of the land drain containing a ceramic pipe, running north-south, first observed in OT602B were visible. Also a large sub-circular tree bowl was observed in the western corner of the trench (feature 20) |
| OT603 | Rough pasture, coastal | F56 | 3.3m | 5.5m | A stone built culvert (Feature 19) was observed running N/S across the SW end of the trench, below the topsoil. |
| OT604 | Fairly flat pastoral land, very close to the coast. | F56 | 2.0m | 0.6m | A modern land drain containing a ceramic pipe was observed running south-west/north-east across the trench. Also an area of intense burning (feature 13) was recorded in the southern corner of the trench. This was most likely the result of vegetation burning. |
| OT604A | Fairly flat pastoral land, immediately east of a stand of pine trees, very close to the coast. | F56 | 8.0m | 0.5m | A possible test pit, similar to the one in OT612 was observed in the northern end of this trench, however due to the very loose nature of the surrounding rock, visibility was poor. |
| OT604B | Fairly flat pastoral land, immediately east of a stand of pine trees, very close to the coast. An extension of OT604A, continuing on from its NNE end. | F56 | 12.0m | 0.9m | A NE/SW orientated back-filled test pit from an earlier phase of GI works was visible cutting across the NNE end of the trench, below the topsoil. The bedrock lay immediately below the topsoil at the NNE end of the trench, but then shelved steeply away after 8.5m. A band of stony material (deposit 4) was visible running SE/NWacross the trench. This deposit is likelty to be the same as deposit 3 observed in OT614/617 - a parallel trench located to the west of OT604B |
| OT605 | Fairly flat pastoral land, very close to the coast. | F56 | 2.0m | 0.52m | None |
| OT606 | Wooded coastal location | F56 | 3.3m | 0.6m | None |

| | | | | | |
|---|---|---|---|---|---|
| OT608 | Excavated in the heavily disturbed ground south of Wylfa A. Due to the risk of contamination in this area this trench was not monitored | F1 | 12.0m | | |
| OT611 | Fairly flat pastoral land | F56 | 2.0m | 0.65m | At its south-eastern end OT611 truncated a low boundary wall (feature 8). |
| OT611A | Enclosed flat pastoral land, sloping to the NE. This trench runs at a right-angle across backfilled trench OT611. | F56 | 8.0m | 0.5m | At its southern corner OT611A truncated a low boundary wall (feature 8). A large sub-circular tree-bowl (feature 22) was also recorded, 13m from the SW end of the trench, 0.5m away from the SE side. A 1m wide feature, likely to have been a backfilled GI trench from a previous phase was observed running E-W across the SW end of the trench, below the topsoil. |
| OT612 | Fairly flat pastoral land | F3 | 2.0m | 4.7m | A cut feature was observed on the northern side of the trench. Further excavation in this area proved this to be a backfilled test pit from an earlier phase of GI works (feature 12). |
| OT612A | Fairly flat enclosed pastoral land | F3 | 9.8m | 0.45m | A series of small burnt out tree bowls, most likely gorse, possibly remnants of a hedge line (feature 21). The southern part of the trench is heavily disturbed - its crosses earlier trenches OT612A and feature 12 - a probable test pit from an earlier phase of works. |
| OT613 | Located in the heavily disturbed area south of Wylfa A, close to the coast and partially over a rock outcrop. Due to the risk of contamination in this area this trench was monitored from a distance. | F1 | 7.6m | 0.1m | None |
| OT614/617 | Fairly flat enclosed pastoral land, close to the coast. | F56 | 2m | 0.45m | The natural sloped down from the NE and SW ends of the trench, forming a valley, with a stony glacial deposit (deposit 3) running E/W through it. This deposit is likely to be the same as deposit 4 observed in OT604B. |

| | | | | | |
|---|---|---|---|---|---|
| OT615 | Enclosed pasture | F6 | 10.5m | 0.4m | A small tree bowl (Feature 23), and 4 modern field drains running parallel to each other (feature 24) were clearly visible below the topsoil. |
| OT618 | Enclosed pasture, sloping gently to the SSW | F4 | 12m | 0.5m | A probable backfilled trench from an earlier phase of GI work was observed in the NE corner of the trench, measuring some 6.0m x 14.0m. Four small burnt out tree bowls (feature 19) were observed below the subsoil, along with a small pit (feature 30) which may have been a stone hole |
| OT620 | Flat Enclosed pasture | F56 | 12m | 0.5m | None |
| OT621 | Located on the edge of the made ground, overlying a trench from an earlier phase of GI works. | F1 | 17.0m | 0.35m | This was termed a Verification Trench, and its aim was to locate a trench from an earlier phase of GI works. This backfilled trench was identified running EW, it appeared to be approximately 7.0m in width, and 17.0m in length. The made ground, associated with the construction of Wylfa A extended some 17m into the trench from the eastern end. Therefore only 2 relatively small areas of undisturbed ground survived in OT621, in the NW and SW corners. No archaeology was observed. |
| OT622 | Flat, slightly boggy enclosed pasture. | F9 | 10.5m | 0.3m | A modern gravel trackway (feature 25) was located just below the topsoil running NE/SW across the N corner of the trench. A 1m wide ditch (feature 26) was observed running N/S down the middle of the trench, below the sub-soil, along with a small field drain (feature 27) and a tree-bowl (feature 28). |

LEGEND

- BH — Borehole Location
- TP — Trial Pit Location
- Haul Road
- Seismic Survey Lines
- Geophysical Survey lines
- Electricity Cable
- OT — Observation Trench Location
- H — Hand Auger Test Location
- FVT — Blasting Points
- a1 — Seismograph Positions
- VN — Flume Positions
- BH 055° — Inclined Borehole (degrees from horizontal) showing orientation and inclination
- HV — FVT Monitoring Points
- BHxxxR (Casing) — Indicates equipment/tools left in boreholes

NOTES:

1. Traverses of seismic and geophysics lines are approximate only. Traverse details are included in the geophysics report.

16 Gwynedd Archaeological Trust Feature

**Figure 01:** Ammended reproduction of Structural Soils Limited exploritory hole location plan, detailing alphanumeric field reference system

| REV. | DATE | DESCRIPTION | BY | CHD. | APR. |
|---|---|---|---|---|---|
| 2 | 07.10.2011 | - | JAH | SAJ | SAJ |

| DIMENSION | SCALE | ORIGIN SIZE |
|---|---|---|
| m | 1:3000 | A1 |


STRUCTURAL SOILS LIMITED

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CLIENT: Horizon Nuclear Power Wylfa Ltd

PROJECT: Wylfa New Build - Intermediate Onshore Ground Investigation

TITLE: EXPLORATORY HOLE LOCATION PLAN

| JOB NO. | FIGURE |
|---|---|
| 725061 | 2 |

| DRAWING STATUS | REV. |
|---|---|
| - | 2 |

0 40 80 120 160 200m

The Wylfa A constrcuiton impact is outlined in BLUE and is based on site observations and historical aerial photographic data (supplied by Halcrow). NOTE: NOT TO SCALE

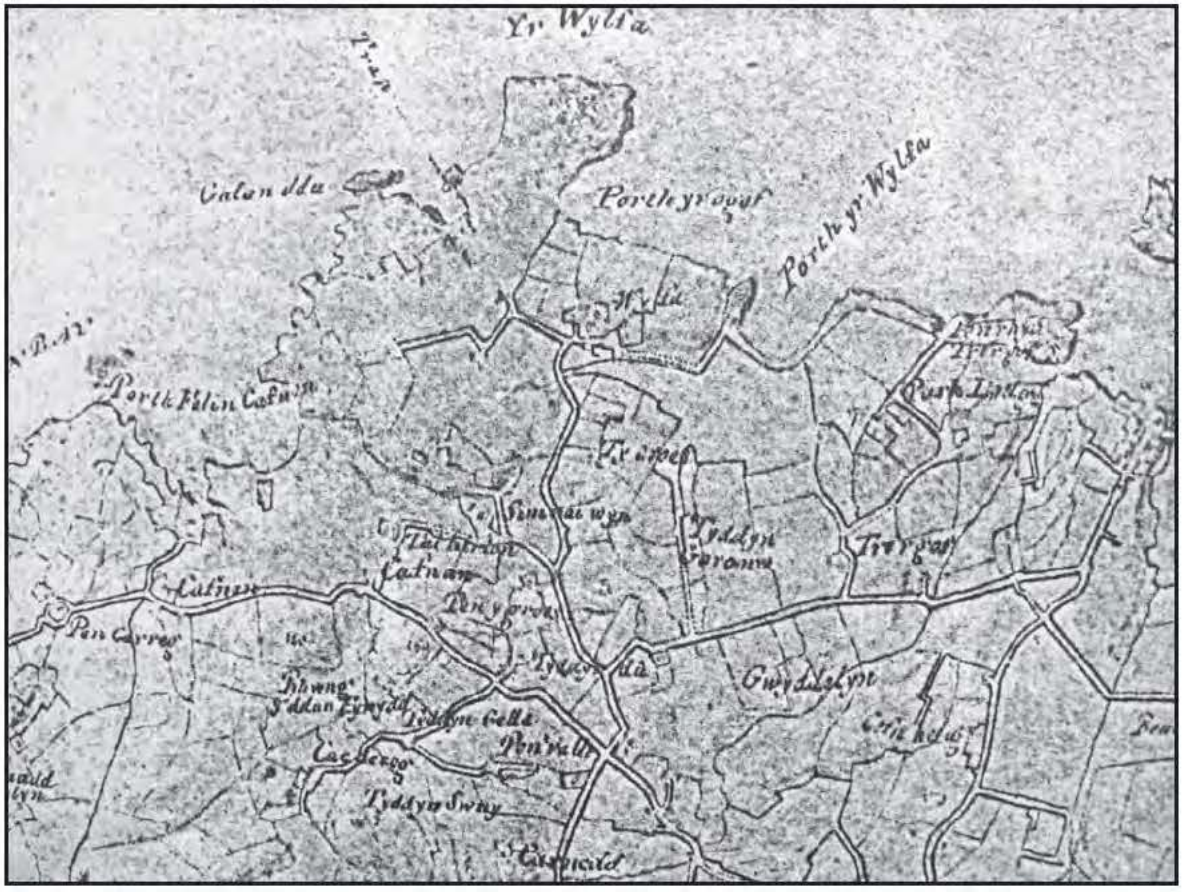


**Figure. 02** Ordnance Survey 2 inch manuscript *c.* 1820's

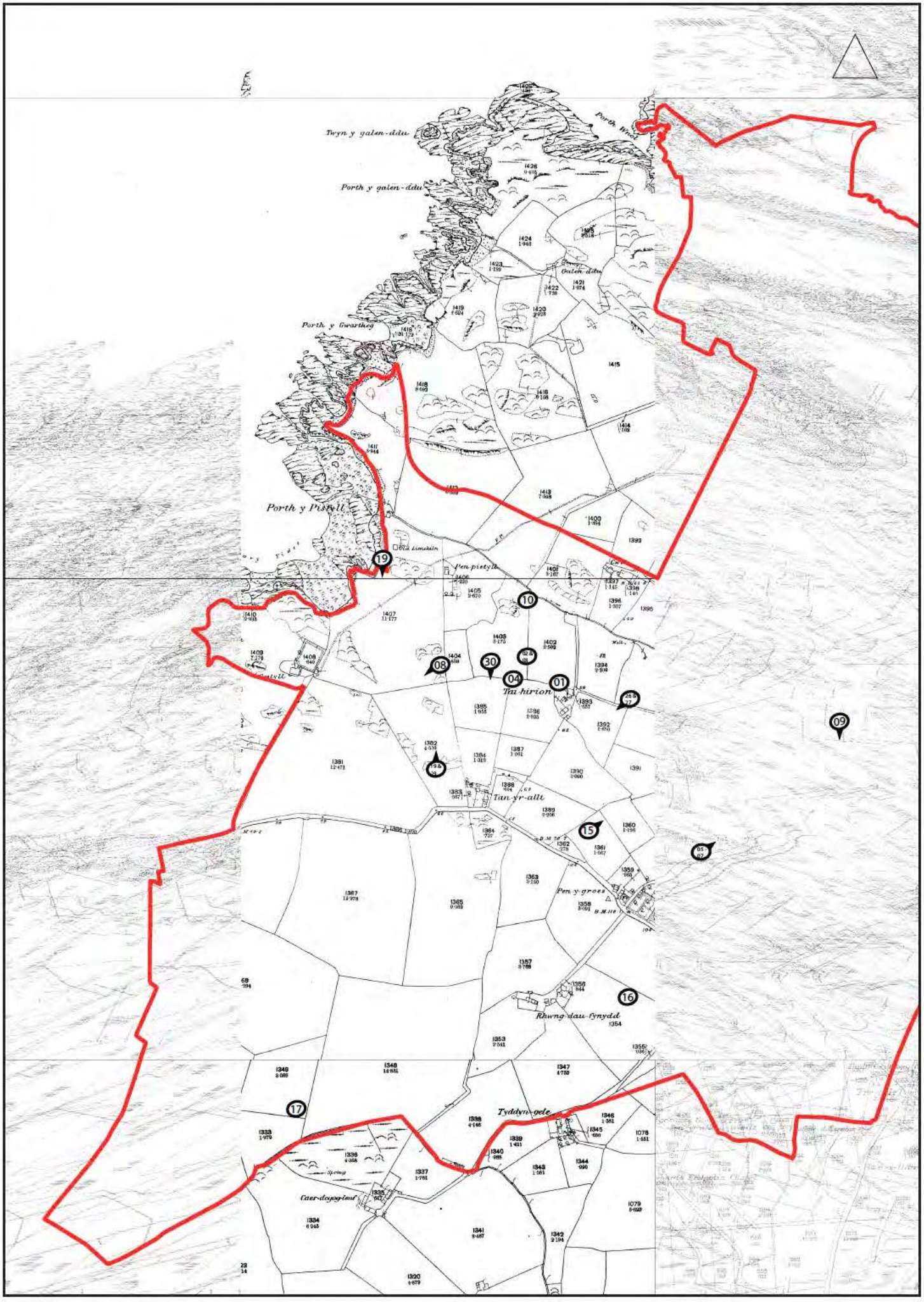


**Figure 03:** Wylfa west 1889. Ordnance Survey, Anglesey County Series, XX.2, XX.6, XXI.0. Scale 1:8,000

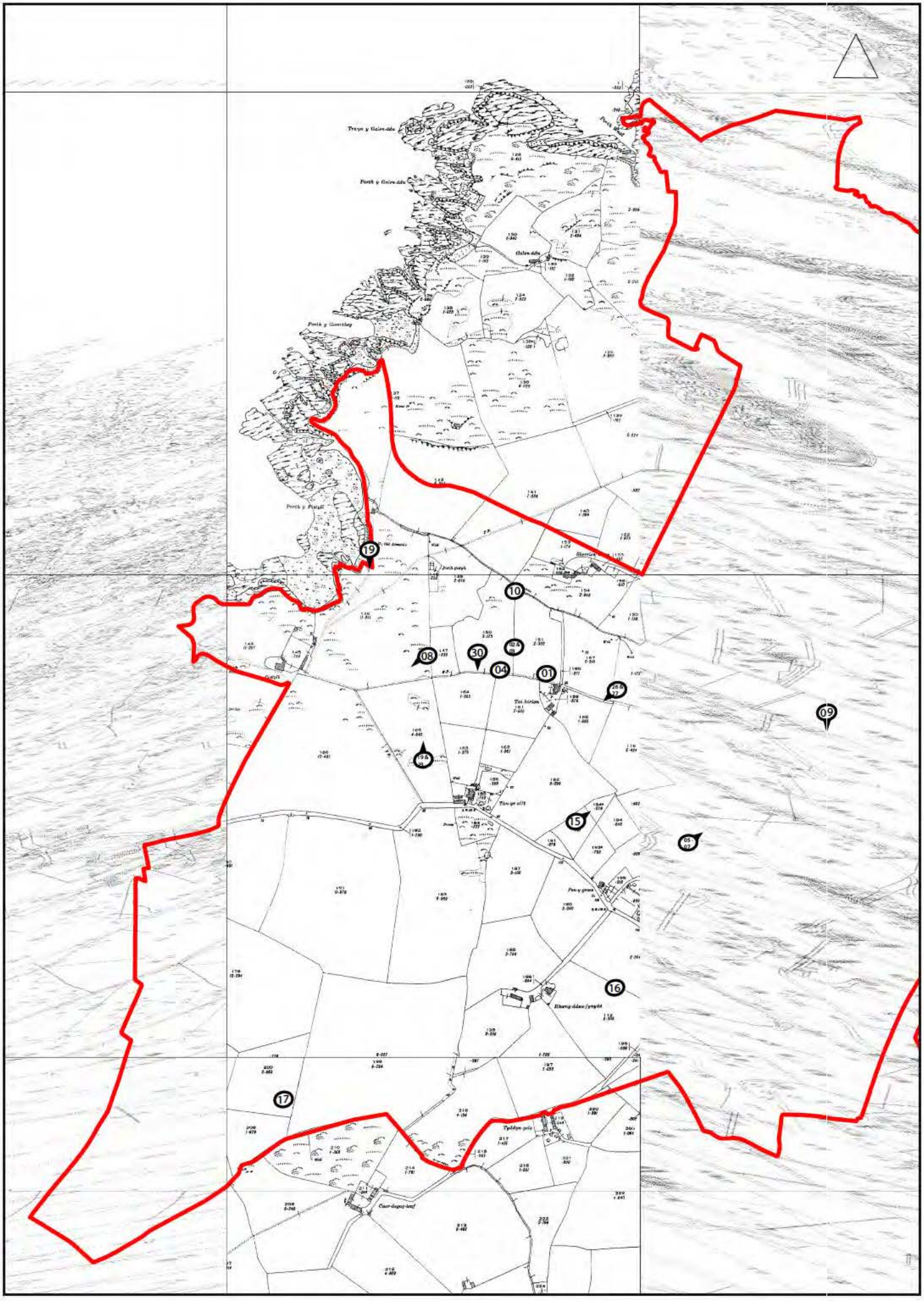


**Figure 04:** Wylfa west 1924. Ordnance Survey, Anglesey County Series, XX.2, XX.6, XXI.0. Scale 1:8,000

KEY = (16) Gwynedd Archaeological Trust Ground Investigation Feature

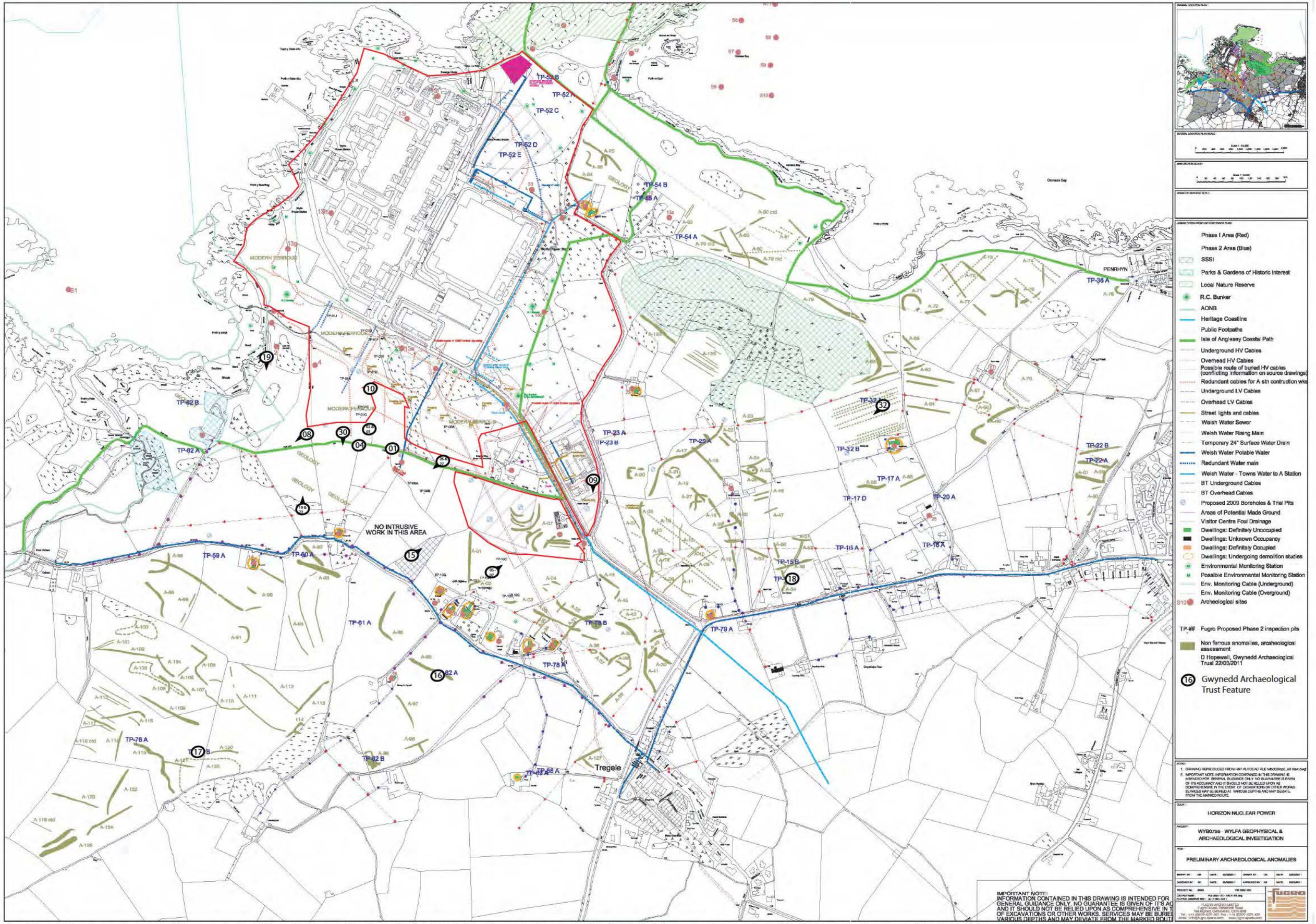


Figure 5: Amended Reproduction of Fugro Aperio VMD survey results plan with Gwynedd Archaeological Trust features identified during the Ground Investigation Programme Watching Brief. The Wylfa A constrcuiton impact is outlined in RED and is based on site observations and historical aerial photographic data (supplied by Halcrow). NOTE: NOT TO SCALE


**Plate 01:** Working shot showing the stripping of the compound area in F9.

**Plate 02:** An example of a completed section of haul road trench (F10).

Plate 03: An example of a hand-excavated bore hole inspection pit (BH 521 within F1) (Scale 1.0m).

Plate 04: An example of a hand excavated Field Vibration Testing inspection pit (FVT-1, array 2 - 2 within F54) (Scale 1.0m).

Plate 05: An example of a machine excavated GI Trial Pit (TP 571 within F9) (Scale 1.0m).

Plate 06: An example of a hand-excavated test pit targeting a geophysics anomaly (TP-76A within F56) (Scale 1.0m).

Plate 07: An example of a small Seismic Hazard Observation Trench (OT604B within F56).

Plate 08: An example of a large Seismic Hazard Observation Trench (OT604B within F56).

Plate 09: Burnt mound material (feature 16) visible in TP-76B (F76).

Plate 10: A short section of an east-west running linear (Feature 18) visible in TP-15B (F15).

**Plate 11:** Feature 3, a low dry stone boundary wall, prior to excavation (F1).

**Plate 12:** Feature 3, following cleaning and the removal of the surrounding tumble (F1) (Scale 1.0m).

Plate 13: South-east facing cross-section of dry stone wall (feature 3) showing the internal construction, following the excavation of a haul road trench (F1).

Plate 14: Short section of dry stone wall (Feature 1), following the removal of vegetation, and prior to its removal (F8/1) (Scale 1.0m).

Plate 15: The capstones of a stone built culvert (Feature 19) running nnw-sse across the se end of OT603 (F56).

Plate 16: The SSW facing cross section of a stone built culvert (Feature 19).

Plate 17: A series of intercutting field drains visible in the haul-road trench in F10 (Features 5 and 7)

Plate 18: A close up of a stone filled field drain (feature 5) observed in the haul-road trench in F10 (Scale 1.0m).

Plate 19: A narrow slot excavated across one of a series of 4 modern field drains (Feature 23) observed within OT615 (F3) (Scale 1.0m).

Plate 20: An investigative slot cut across a large tree bole (feature 20) observed within OT602A (F56) (Scale 1.0m).

**Plate 21:** Pre-excavation shot of a small burnt-tree bole (feature 21) observed within OT612A (F3) (Scale 1.0m).

**Plate 22:** Post-excavation shot of a small burnt-tree bole (feature 21) observed within OT612A (F3)
The section shows a charcoal rich fill, with a very diffuse interface and evidence of root action (Scale 1.0m).

Plate 23: A general shot of the haul road trench in F1, the change in the soil colour indicates the start of the disturbed area.

Plate 24: A close up shot of the disturbed area in F1, observed in the haul road trench. The made ground contained frequent boulders and waste material including wood and metal.

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