

Client: Joanne Creese

Project: Proposed housing development

Location: Land off Gelligaer Road, Trelewis

Drone image dated 10/9/2020



Dr. J. Stewart Noake
1, Rhoose Road
Rhoose
Barry
Vale of Glamorgan
CF62 3EQ
Tel. 01446 679001
Email:
jsngeologist@aol.com

Date: September 2020

Dr. J Stewart Noake
Engineering Geologist
and
Mining Consultant

1, Rhoose Road
Rhoose
Barry
Vale of Glamorgan
CF62 3EQ
Tel; 01446 679001
Email: jsngeologist@aol.com

**Ms Joanne Creese
'Gwynfa'
Penywaun Farm
Heol Fawr
Nelson
CF46 6PL**

Date: September 2020

Dear Madam,

Proposed development on land off Gelligaer Road, Trelewis;

Mining Risk Assessment & Geotechnical Report

Terms of reference

This report has been produced for Ms Joanne Creese and concerns the suitability of a plot of land off Gelligaer Road, Trelewis for the construction of some new detached houses given that the possibility of shallow mine workings and uncertain soils have been identified at the site.

This report also contains a Mining Risk Assessment.

Information Available

Information for this report has been obtained from several site visits between May 2013 and September 2020, the excavation of four trial pits, The Tithe Map dated 1810, the Old County Map Editions for Monmouth sheet XIX dated 1875 1898, 1918, the 1938, 1948, 1960 and modern National Grid Series maps, Geological sheet ST 19 NW, Google images dated 1945, 2001, 2004, 2006, 2010, 2013, 2016, 2018 and 2020, online information and mining abandonment plans including SWR 3079, from British Coal's Mansfield Abandoned Mines Records Office, the memoirs of the Geological Survey for the Country around Newport dated 1909 and 1969 and the country around Pontypridd and Maesteg (1903 & 1964) and local archive material including a list of all Collieries that worked in the area by Mr. R.A. Lawrence, a local historian.

In addition, several reports have been prepared by the author in the area over the last 40 years and these have also been consulted as well as the author's own voluminous archives.

This report should be read with reference to the accompanying plans, diagrams and photographs.

General

The site (Fig.1 and front cover) is located at National Grid Reference ST111967 at an elevation of some 155m AOD and lies to the south-east of Gelligaer Road, Trelewis. This is a greenfield site that is presently overgrown with brambles and scrub and lies some 1 - 1.5m below the level of the adjacent road (Front cover inset). It is bounded to the north-west by

Gelligaer Road, to the south-west by an adjacent recently constructed property, to the north-east by Cath's Farm Shop and a field to the south-east.

Historical records (Figs 2, 3, 4 & 5) show the site as undeveloped on the Tithe, 1875, 1898, 1918, 1938, 1948 and 1951 editions, the 1945 aerial photograph and all subsequent Google images up to 2020 and the drone image on the front cover. The adjacent building to the south-west has been recently constructed and was also investigated by the author. A new housing estate has recently been constructed to the north-east of the site.

A watercourse is shown on all of the map editions with 'rises' being added on the 1914 - 1948 editions, nothing is again indicated on the 1960 edition and 'issues' being shown on the 1990 edition. This is described in detail later in the section entitled 'Hydrology and Hydrogeology'.

Geology

Solid geology

The site is underlain by strata of Carboniferous Age belonging to the Grovesend Beds above the Mynyddislwyn Seam, which crops well to the west (Fig.2) beyond a faulted contact. These strata, which are not exposed at the site, comprise a sequence of mainly coarse grained and very thickly bedded, very wide spaced jointed, extremely strong gritstones overlying mudstones and siltstones associated with the Mynyddislwyn Seam and lie in a faulted trough on the south-western side of the Gelligaer Fault and north-eastern side of the Llanfabon Fault with a very gentle dip to the north into the Blackwood Syncline. The seam itself comprises a 1.5m thickness of coking quality coal and lies at a depth of some 40m below the site.

These strata have been faulted on NW and NE axes with the major Gelligaer Fault lying well to the north-east of the site and the parallel Llanfabon Fault well to the west so that the site lies in a faulted trough. There are several minor faults recorded below the site in the Mynyddislwyn Seam workings beneath the site.

Superficial deposits

These strata are in turn indicated as overlain by a layer of glacial sand and gravel soils deposited in an extensive late glacial lake with Glacial till lower down the hillside by the Geological Survey (Fig. 2). In the event, all four trial pits proved a different sequence to that predicted by the Geological Survey with only glacial till underlying the site with a variable layer of colluvium above.

The soils at the site were investigated by logging the available natural exposures nearby and the excavation of four trial pits. In the event, all four trial pits proved an identical sequence of organic topsoil up to 0.4m thick overlying an orangey brown, soft becoming firm, silty clay, which is a colluvial soil or head deposit down to a depth of 0.9m. Both of these types of soil are unsuitable as a founding stratum and will have to be stripped from below any new foundations.

The underlying soil down to a maximum recorded depth of 1.2m was found to comprise a greyish-green with orange mottling towards the top, soft to firm becoming stiff, silty sand with rounded gravel, cobbles and boulders which is a glacial till. This is an ideal founding stratum and this is discussed further in the following section entitled 'Foundations'.

Foundations

The site investigation has shown that the existing site level is 1 - 1.5m below road level. In order to develop the site, the off road parking area and egress from the site will have to be at road

level which will entail making the site up to road level. This will also be necessary to establish service connections to the proposed property.

The site investigation also showed a variable thickness up to some 0.9m of organic topsoil and colluvium at the site which are both unsuitable as a founding stratum and will have to be stripped from below any new foundations. The underlying soils were found to comprise a firm glacial till which is strong in engineering terms and will adequately support traditional strip type foundations.

In order to develop the site, it will be necessary to strip the whole of the upper unsuitable soil layers and to remove them from the site. The site level should then be made up to road formation level with imported clean, inert granular fill such as crusher run or quarry scalplings. As this material is a virgin quarry product, it is exempt from contaminant testing. This material should be compacted in 150mm layers with a minimum of five passes of a ten tonne vibrating roller to construct an engineering plinth. The new building may then be safely constructed on a lightweight raft or modified raft design with a ground bearing slab. An allowable bearing capacity of 50kPa would be appropriate.

As this is a coalfield area, there is the continual risk of the emission of coalfield gases such as methane, which is a natural process. In order to prevent the build up of such gases and indeed any gases including the extremely remote possibility of radon, an impermeable polythene barrier should be placed below all new concrete foundation areas.

Hydrology and Hydrogeology

As mentioned in the General section above, there is a watercourse shown on the early map editions with 'rises' indicated at the northern end adjacent to the road and it was decided to investigate this with trial pit TP 1. There is a 200mm diameter pipe feeding the gully drainage from the road onto the site and the cover to the manhole cover adjacent to the road was lifted to inspect this as it is the only source of water entering the site.

In the event, a 200mm diameter pipe was found to be leading from a recently constructed manhole cover adjacent to the highway (TP 1). In the event, two road gully feeds were found in the chamber. One from the north-east and the other from the south-west that is known to be blocked from a camera survey. This means that there is only a short road gully feed to the overflow pipe leading to the site.

Trial pit TP 1 was excavated across the line of the watercourse to determine the amount of alluvium present and the results are presented in the records of TP 1. In the event, no alluvium was encountered nor was there any signs of the watercourse being active, nor was there any signs of 'rises' as indicated on the earlier maps. This includes the period from 2013 - 2020 when the site was being monitored for the earlier property development.

The investigation proved the presence of organic topsoil infilling the line of the watercourse as shown in the photograph accompanying TP 1 where the natural succession of colluvium down to glacial till was encountered. There is no way that the glacial till below the site can be the source of groundwater as it is effectively impermeable. This was taken to indicate that the watercourse had not flowed significantly in recent times.

Accordingly, it is recommended that the 200mm diameter pipe be extended across the site to its southern margin in a suitable bedded stone surround wrapped in terram or similar to permit the flow to continue, should it ever be re-established. This can then be buried beneath the proposed

infilling of the site as a whole and connected to the open ditch coursing along the south-western side of the site.

Groundwater was not encountered in any of the trial pits nor was there any sign of any transient phreatic surface staining.

Raising the site level will also effectively prevent the possibility of future flooding.

It is considered that neither surface nor groundwater are an obvious problem at the site.

Site run off drainage/soakaway

The site is lower than the surrounding area and as such has a very restricted catchment. At present, the site is fed by a 200m diameter pipe that imports road gully drainage which it is proposed to pipe across the site as described above to connect with the open ditch at the south-western end of the site.

The possibility of constructing a soakaway at the site was investigated but discounted for the following reasons. A soakaway is 2m long by 1m wide and 2m deep and must have at least 1m of permeable material above the water table below for the water to drain into. This cannot be achieved at this site due to the potential for groundwater at the surface from the gully drainage as so was discounted.

In addition, the site development will entail making up the site level by some 2m with imported fill such as crusher run or quarry scalplings.

As it is illegal to construct a soakaway in fill materials, then the roof and hardstanding drainage from the site after development will have to be fed into the open drainage ditch in the south-west.

Mining

There are no recorded or suspected mine entries beneath or within influencing distance of the site (Fig. 2 and insets).

The shallowest recorded Coal Seam below the site is Mynyddislwyn Seam and the mining abandonment plans indicate that it has been completely worked out beneath the site and lies at a depth of some 40m. These workings were essentially completed by the turn of the Nineteenth century from Llancaich Colliery to the east. It is considered that these workings in the Mynyddislwyn Seam are at sufficient depth not to pose a threat to the proposed new development.

Mining in the deeper seams were in the Brithdir Seam but mainly in the underlying Main Productive Coal Measures and were prosecuted from Trelewis Deep Navigation (Ocean) Colliery which closed in 1990 to the west and Penallta Colliery to the east at depths in excess of 500m, the last workings being from Penallta Colliery in the Meadow Vein in 1990. All subsidence strains associated with these workings are normally completed within one month of extraction and will now have ceased as that colliery closed in 1990 having been opened in 1906 by the Powell Duffryn Steam Coal Company.

Mining Risk Analysis

This investigation has shown the site to be clear of all recorded mine entries.

The shallowest recorded workings below the site lie at a depth of some 40m and were

completed by the end of the Nineteenth Century. All deeper mining in the main productive measures and overlying Brithdir Seam were completed before 1990 when both the Trelewis Deep Navigation and the Penallta collieries finally closed.

It is thus considered that the risk to the proposed development from previous mining activity is zero.

Conclusions

The site is underlain by strata of Carboniferous Age belonging to the Grovesend Beds above the Mynyddislwyn Seam and are not exposed at the site.

These strata are in turn overlain by glacial soils which are a strong in engineering terms.

It is recommended that the site be stripped of unsuitable surface organic soils and then filled with quarry scalplings or crusher run to formation level sufficient to establish service connections and enable site access at road level. The property may then be safely constructed on a lightweight or modified raft type foundation.

A 200mm diameter pipe has been identified as feeding road gully drainage onto the site. It is recommended that this be extended beneath the proposed development in a terram surrounded pipe bedded in suitable coarse granular material to the open ditch at the south western end of the site. This will then be buried beneath the proposed filled site.

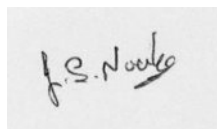
No threat has been identified for either surface or ground water and the development of the site will effectively prevent the risk of flooding.

After development by filling, the site will be unsuitable for a soakaway and surface drainage will have to be accommodated within the existing open ditch watercourse at the southern end of the site.

No threat has been identified from previous mining activity. It is considered that the risk to the proposed development from previous mining activity is zero.

The conclusions in this report are based on a review of the information available. There may be local conditions at the site that could affect the development such as high seasonal local groundwater conditions or local pockets of weak soils or fill although this is considered extremely unlikely. Should such conditions come to light during the site development, then the conclusions of this report should be reviewed and appropriate measures adopted.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'J.S. Noake', is written over a light grey rectangular background.

Dr. J. S. Noake BSc, PhD, FGS. C. Geol.

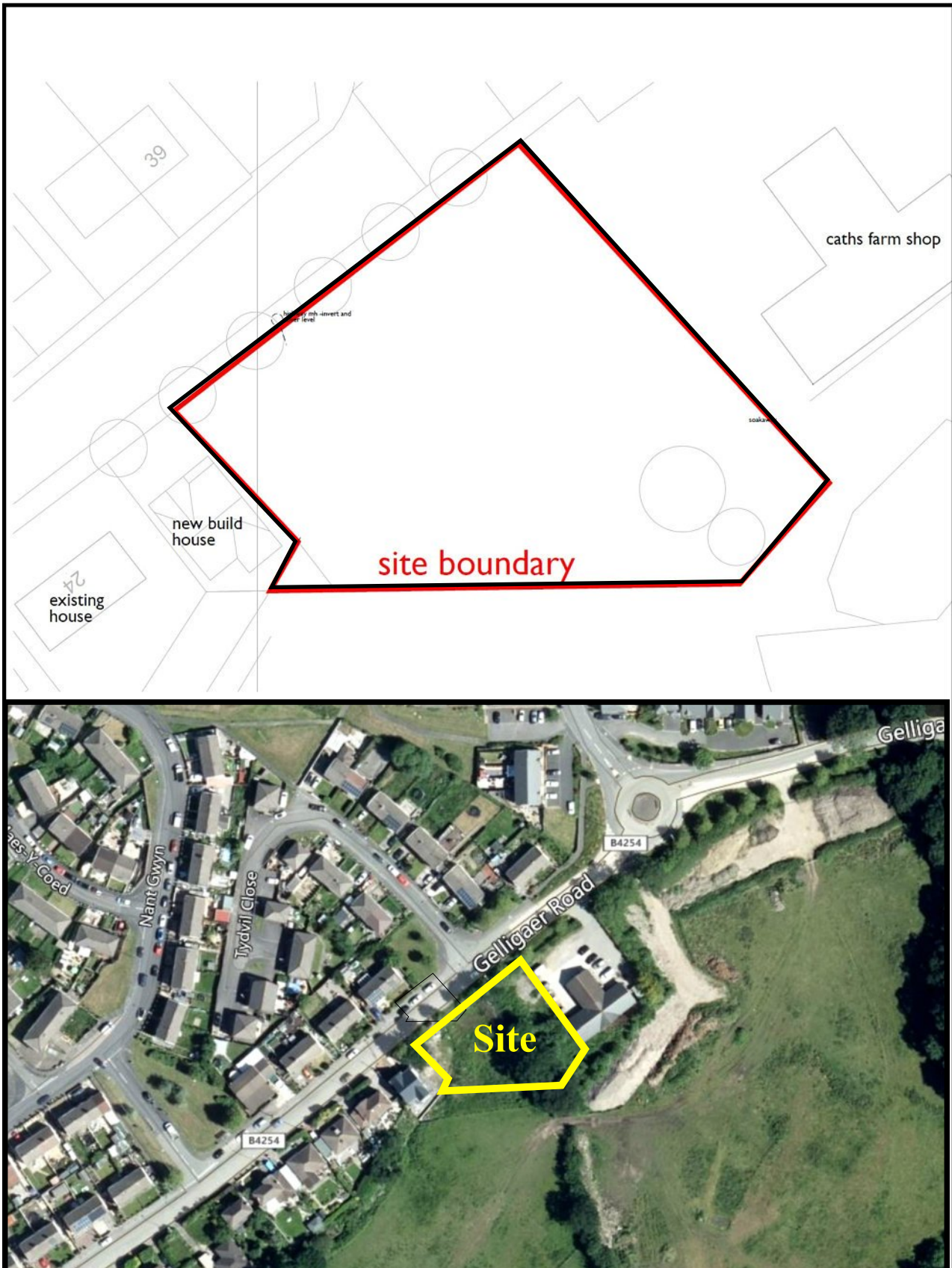


Fig. 1

**Proposed development off
Gelligaer Road, Trelewis;
Location plan**

Scale as shown

Dr J S Noake September 2020



Fig. 2 Proposed development off Gelligaer Road, Trelewis;
Geological plan with mining details (inset)

Scale as shown

Dr J S Noake September 2020

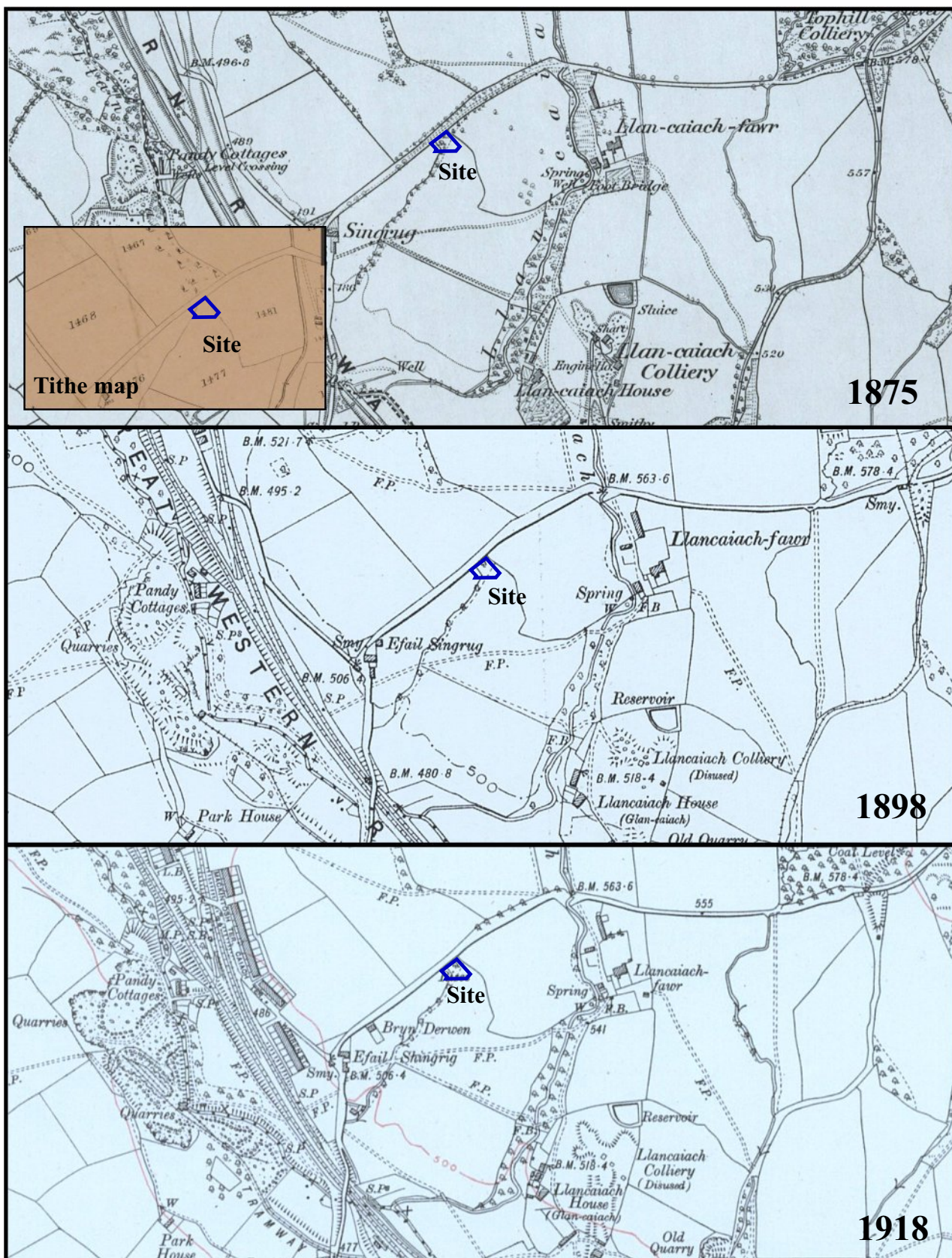


Fig. 3

Proposed development off Gelligaer Road, Trelewis; Historical plans Tithe, 1875, 1898 & 1918

Scale as shown

Dr J S Noake September 2020

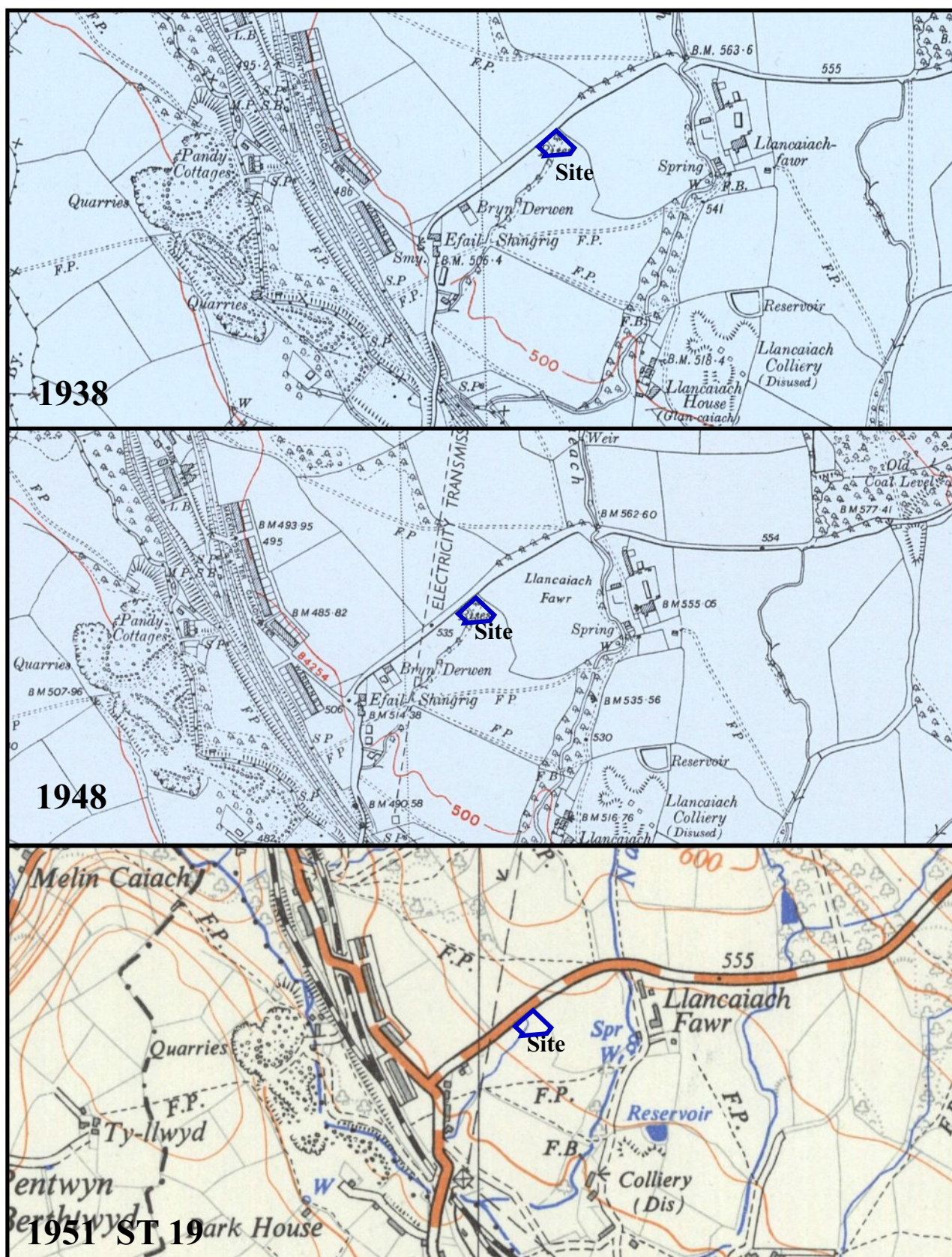


Fig. 4

Proposed development off Gelligaer Road, Trelewis; Historical plans 1938, 1948 & 1951

Scale as shown

Dr J S Noake September 2020

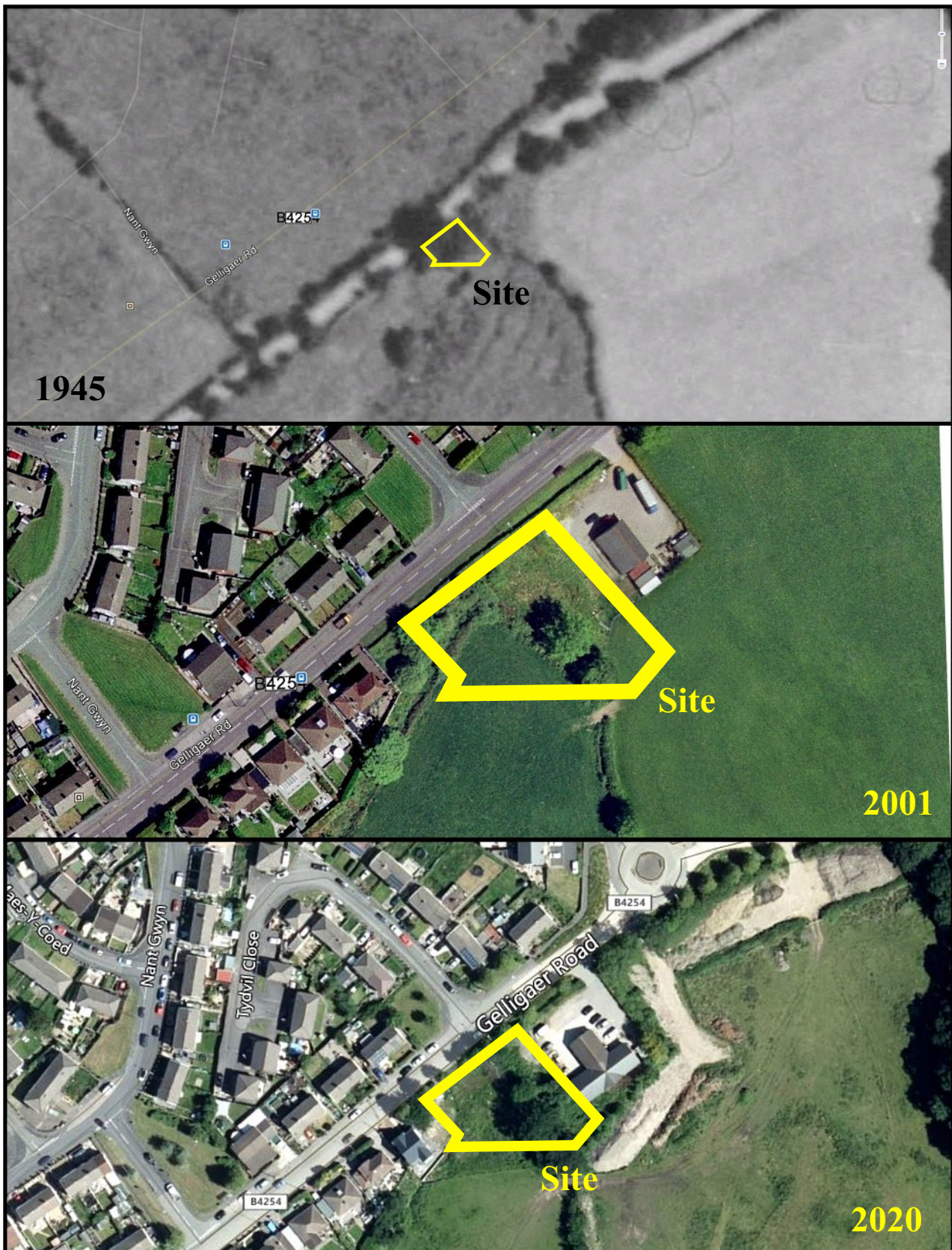
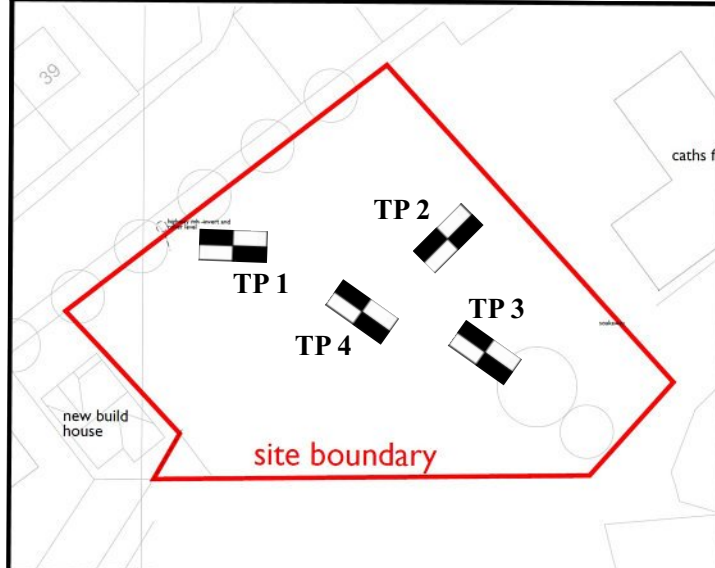
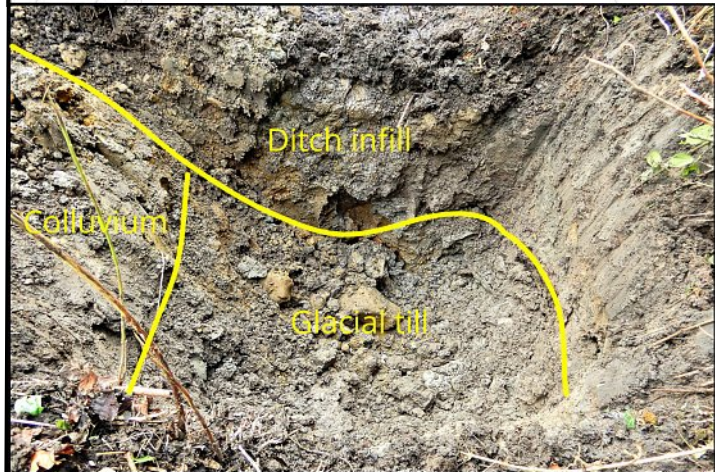


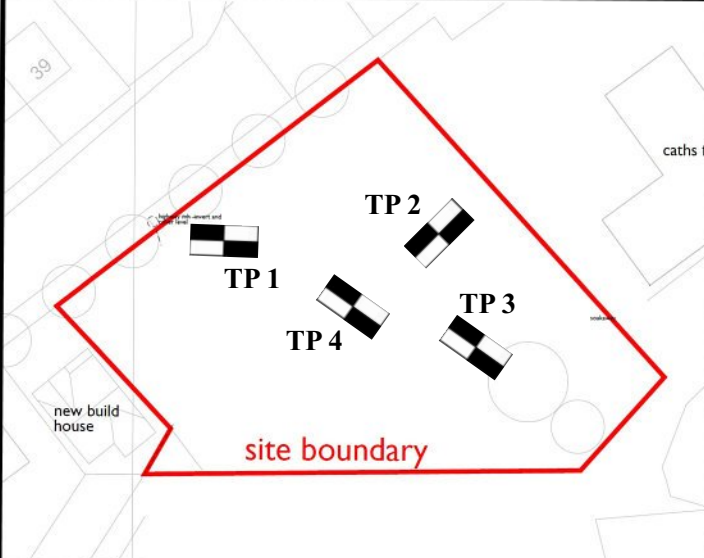
Fig. 5

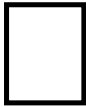
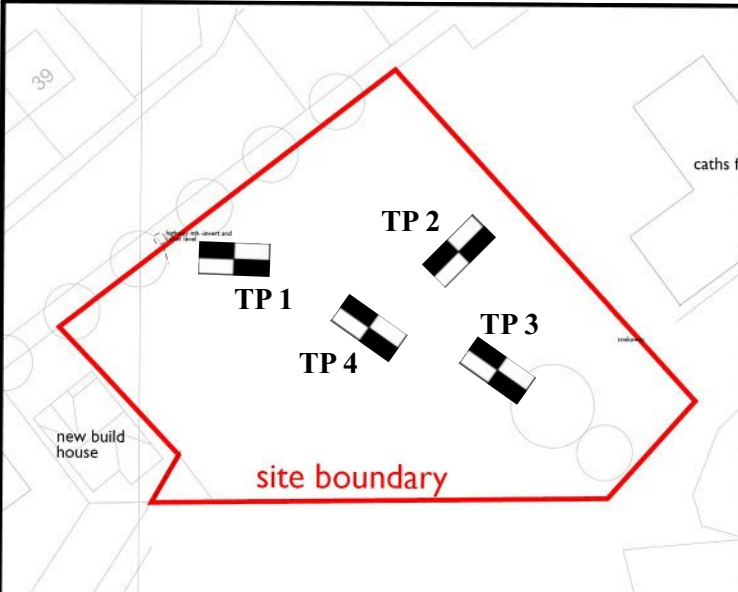
**Proposed development off
Gelligaer Road, Trelewis;
Google images 1945, 2001 & 2020**

Scale as shown

Dr J S Noake September 2020

CLIENT: Joanne Creese SITE: Land off Gelligaer Road, Trelewis Method of excavation: Machine Contractor: Steve Rees Elevation: 155m AOD Date: 10th September 2020 National Grid Reference: ST111967	Record of Trial Pit TP 1
	Plan (not to scale) 1m N090 degrees  1.5m
Details	Description
	0.00 - 0.20m increasing to 0.70m within the ditch. Black silty very organic silty sand; Organic topsoil. 0.20 - 0.90m Orangish-brown, soft becoming firm, sandy, silty clay: Colluvium. 0.90 - 1.20. Grey and green with orange mottling at the top, firm silty sand with rounded gravel, cobbles and boulders; Glacial till.
	
Water: Dry	Remarks: Old drainage ditch.
Samples/Test: None	
Logged by: JSN Date: 10/9/2020	Scale as shown

CLIENT: Joanne Creese		Record of Trial Pit TP 2
SITE: Land off Gelligaer Road, Trelewis		
Method of excavation: Machine		Plan (not to scale) 1m N040 degrees 1.5m
Contractor: Steve Rees		
Elevation: 155m AOD Date: 10th September 2020		
National Grid Reference: ST111967		
Details		Description
		0.00 - 0.20m Black silty very organic silty sand; Organic topsoil. 0.20 - 0.50m Orangish-brown, soft becoming firm, sandy, silty clay: Colluvium. 0.50 - 1.20. Grey and green with orange mottling at the top, firm silty sand with rounded gravel, cobbles and boulders; Glacial till.
		
Water: Dry		Remarks:
Samples/Test: None		
Logged by: JSN Date: 10/9/2020		Scale as shown

CLIENT: Joanne Creese		Record of Trial Pit TP 3	
SITE: Land off Gelligaer Road, Trelewis		Plan (not to scale)	
Method of excavation: Machine		1m N130 degrees	
Contractor: Steve Rees			
Elevation: 155m AOD Date: 10th September 2020		1.5m	
National Grid Reference: ST111967			
Details		Description	
		0.00 - 0.20m Black silty very organic silty sand; Organic topsoil. 0.20 - 0.90m Orangish-brown, soft becoming firm, sandy, silty clay: Colluvium. 0.90 - 1.20. Grey and green with orange mottling at the top, firm silty sand with rounded gravel, cobbles and boulders; Glacial till.	
			
Water: Dry		Remarks:	
Samples/Test: None			
Logged by: JSN Date: 10/9/2020		Scale as shown	

