Fferm Solar Larnog

Environmental Statement

Volume IV, Appendix 11D: Mineral Resource Assessment

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Issue Sheet

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Document Title

Volume IV, Appendix 11D: Mineral Resource Assessment

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List of Contents

1. Mineral Resource Assessment 1
1.1. Introduction 1
1.2. Site Details 4
1.3. Mineral Planning Policy 15
1.4. Mineral Resource Assessment 22
1.5. Conclusions 25

List of Figures (Annex A)

Figure 1 – Site Location Plan

Figure 2 – Site Layout Plan

Figure 3 – Artificial and superficial deposits

Figure 4 – Bedrock geology

Figure 5 – Mineral resource data (BGS Mineral Resource Map, 2010) and BGS records of mineral workings

Figure 6 – Mineral resource data (BGS, GIS only) and BGS borehole locations reviewed

Figure 7 – Bedrock Aquifer Designations

Figure 8a – Sensitive Land Uses

Figure 8b – Agricultural land classification

Figure 9a – Mineral Safeguarding Area (Limestone 1)

Figure 9b – Mineral Safeguarding Area (Limestone 2)

Figure 9c – Mineral Safeguarding Area (Limestone 1 & 2 combined)

Figure 10 – Dormant Mineral Sites

List of Tables

Table 1 - Bedrock Geology Across the Site and Surrounding Area (BGS)

Table 2 - Mineral Resources Identified on Site

Table 3 - Summary of BGS Borehole Logs

Table 4 - Location of Aquifer Designations

Annexes

Annex A - Figures

Annex B - BGS borehole records reviewed

1. Mineral Resource Assessment

1.1. Introduction

Authorisation

1.1.1. WSP was commissioned by Trydan Gwyrdd Cymru (the 'Applicant') to provide a Mineral Resource Assessment (MRA) for the proposed Fferm Solar Larnog (Larnog Solar Farm), Cosmeston, Vale of Glamorgan, South Wales (referred to hereafter as the "Proposed Development"). The Proposed Development would be located on land approximately 500 m south-west of Penarth and 550 m east of Sully (hereafter 'the Site').

1.1.2. The study area consists of the land within the Site and the land surrounding it that is deemed relevant to the assessment. Please refer to **Figure 1 (Annex A)**.

1.1.3. This MRA has been prepared as part of the statutory pre-application consultation process.

Study Aims

1.1.4. The purpose of the MRA is to establish whether the Proposed Development is located within a Mineral Safeguarding Area[1] (MSA), as defined by the Vale of Glamorgan Council Mineral Planning Authority, and to provide a balanced assessment to ensure that potential mineral resources are not being unnecessarily sterilised.

1.1.5. The assessment takes into account the extent of any mineral resources, minerals planning policy, and the outcome of consultations with a local quarry operator.

Proposed Development

1.1.6. The Proposed Development comprises the construction, operation, and decommissioning of approximately 35 megawatts (MW) of ground-mounted solar PV, including substation and Battery Energy Storage System (BESS), ancillary equipment and associated infrastructure.

1.1.7. The area in which the Proposed Development would be located is referred to as the Site, which is approximately 46.54 hectares (ha) in size (subject to change). **Figure 1 (Annex A)** presents the Site location plan. **Figure 2 (Annex A)** presents the indicative layout of the Proposed Development.

[1] Mineral Safeguarding area - "*an area designated by a Mineral Planning Authority which covers known deposits of minerals which are desired to be kept safeguarded from unnecessary sterilisation by non-mineral development*". Gov.UK (2014). Guidance on the planning for mineral extraction in plan making and the application process. Available online at: https://www.gov.uk/guidance/minerals#Definitions-in-minerals-guidance (access: September 2026).

1.1.8. The Proposed Development would have an operational lifetime of 40 years. At the end of the operational life, the Proposed Development would either be repowered (subject to a new planning application) or decommissioned. It is anticipated that, after the operational period, the Site would be returned to agricultural use and established habitats and planting, such as hedgerows and woodland, would be retained.

Sources of Information

1.1.9. The following sources of information were used in this assessment.

National Policy:

- Future Wales: The National Plan 2040, Welsh Government, February 2021;
- Planning Policy Wales (PPW), Edition 12, Welsh Government, July 2024; and
- Minerals Technical Advice Note (TAN) Wales 1: Aggregates, Welsh Government, March 2004.

Local Policy:

- Vale of Glamorgan Local Development Plan (LDP) 2011-2026, Adopted June 2017;
- Vale of Glamorgan LDP 2011-2026, Supplementary Planning Guidance, Minerals Safeguarding, April 2018;
- Vale of Glamorgan LDP 2011-2026, Proposals Map, June 2017 (PDF version and Interactive Proposals Map (MyVale Interactive Map)); and
- Vale of Glamorgan Council Replacement LDP 2021-2036, Deposit Plan, November 2025.

Publicly Available Information:

- British Geological Survey (BGS) GeoIndex Online Map Viewer, accessed online 21/08/2026;
- BGS and Welsh Assembly Government, Mineral Resource Map of Wales, South East Wales, 1:100,000 scale, 2010;
- BGS and Department of the Environment, Transport and the Regions (DETR), Mineral Resources map (other than coal), South Wales, 1:100,000 scale, 1997;
- BGS and DETR, Mineral Resource Information for Development Plans, South Wales: Resources and Constraints, 1997;
- BGS, Mineral Planning Factsheet, Brick clay, 2022;
- BGS and Welsh Government, Aggregates Safeguarding Maps of Wales, Mineral Resources and Policy Team, Report Reference CR/12/039N, 2012;
- Mining Remediation Authority Map Viewer, accessed online 21/08/2026;
- DEFRA Magic Map Viewer, accessed online 21/08/2026;
- BGS Lexicon of Named Rock Units, accessed online 21/08/2026;

- National Library of Scotland, Historical Ordnance Survey Maps, accessed online 02/09/2026;
- Environment Agency, Guidance: Protect Groundwater and Prevent Groundwater Pollution, July 2025;
- Welsh Government and Natural Resources Wales Data Map Wales, accessed online 04/09/2026;
- Royal Commission on the Ancient and Historical Monuments of Wales, Site Record Lavernock Point Fortified Battery, accessed online 04/09/2026; and
- South Wales Regional Aggregates Working Party (SWRAWP) Annual Report 2024, Published January 2026.

Structure of this Document

1.1.10. This MRA is structured as follows:

- **Section 1.2** describes the Site and its surroundings;
- **Section 1.3** sets out the national and local planning policy context in relation to minerals, and consultation with relevant parties;
- **Section 1.4** provides the MRA; and
- **Section 1.5** provides the summary and recommendations.

1.2. Site Details

Published Geological Records and Historical Mapping

1.2.1. A review of BGS[2] mapping showed no Artificial/Made Ground within the Site Boundary. Artificial/Made Ground is recorded by the BGS approximately 325 m east of the solar parcels (approximately 120 m north of the Ecological Mitigation Area) and approximately 365 m east of the solar parcels (and 50 m north of the Ecological Mitigation Area). **Figure 3** shows the artificial deposits in the area surrounding the Site.

1.2.2. Historical mapping (National Library of Scotland)[3] from 1921-1922 indicate that these areas of Artificial/Made Ground may be associated with historical quarries, railway lines, landfills and possible refuse heaps. Historical mapping also indicates the presence of several small former quarries and limekilns on-site (discussed in **paragraph 1.2.15**). Mapping also shows a disused railway line running adjacent to the northern section of the Site from east-west. It should be considered that Made Ground may be present on-site associated with these historical features.

1.2.3. BGS mapping does not show any superficial deposits to be present on site. Beach deposits (sand and gravel) are shown approximately 150 m south of the Site. Alluvium (clay, silt, sand and gravel) are shown approximately 230 m north associated with Sully Brook. **Figure 3** shows the superficial deposits in the area surrounding the Site.

1.2.4. A review of the BGS Geoindex and associated digital bedrock geology datasets[4] identified a succession of limestone, mudstone and conglomerate formations across the Site and surrounding area. **Figure 4** (see **Annex A**) illustrates the mapped bedrock geology, whilst **Table 1** summarises the geological units present.

1.2.5. Two faults cut through the Site as shown in **Figure 4** (see **Annex A**); one orientated north/north-west to south/south-east in the west of the Site and the other west/north-west to east/south-east in the centre to east of the Site. Additional faults with various orientations are shown to the north and south of the Site.

[2]British Geological Survey (BGS). GeoIndex Online Map Viewer. Available Online at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ (Access: August 2026).

[3] National Library of Scotland. Historical Ordnance Survey Maps. Available Online at: https://maps.nls.uk/os/ (Access: August 2026).

[4] British Geological Survey (BGS). GeoIndex Online Map Viewer. Available Online at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ (Access: August 2026).

Table 1 - Bedrock geology across the Site and surrounding area (BGS)

Bedrock Geology	Description	Location On Site	Surrounding Area
Mercia Mudstone Group	Mudstone	In the north of the central region of the Site.	Extends to the north of the Site.
Mercia Mudstone Group (Marginal Facies)	Conglomerate	Within the west of the Site.	Extends to the north, west and south of the Site.
Friars Point Limestone Formation	Limestone	A small area to the west of the central region of the Site.	Extends to the north of the Site.
Friars Point Limestone Formation	Dolomitised limestone and dolomite	A small area, the southern tip of the Friars Point Limestone Formation (Limestone) geological unit.	Only within the Site Boundary.
Blue Anchor Formation	Mudstone	In the centre of the Site.	Extends to the north of the Site. It is also shown approximately 280 m south of the Site.
Penarth Group	Mudstone and limestone, interbedded	In the south of the central region of the Site and a band orientated north-south in the east of the Site, and the eastern edge of the eastern parcel.	A small area extends to the south of the Site Boundary. The band in the east extends to the north. This is also located approximately 250 m south of the site.
St Mary's Well Bay Member	Interbedded limestone and mudstone	Encroaches into the Site in south of the central region, is located in the southern-most corner and in a band orientated north-south in the east of the Site and comprises most of the eastern parcel.	Extends to the north and south of the Site.
Lavernock Shale Member	Mudstone	Along the eastern and southeastern boundaries and the western boundary of the eastern parcel.	Extends to the south and east of the Site.
Gully Oolite Formation	Ooid limestone	Not within the Site Boundary.	Occurs immediately southwest of the Site.
Porthkerry Member	Interbedded limestone and mudstone	Not within the Site Boundary.	Beyond the Lavernock Shale Member to the south-east of the Site.

Potential Mineral Resources

1.2.6. A review of the BGS Mineral Resource data has been undertaken. The following sources have been consulted, and the relevant mineral resource information is presented on **Figure 5 (Annex A)**.

- BGS Mineral Resource Map of Wales (2010) [5];
- BGS Mineral Resource Data (GIS only) (BGS GeoIndex[6]) (Note this shows sandstone resource which is not shown on the 2010 map); and
- BGS Mineral Resource Map (1997)[7].

Table 2 – Mineral resources identified on Site or within 100 m

Mineral resource category	Mineral resource	Associated geology	Location	Approximate size
Limestone	High purity limestone (>97% $CaCO_3$): Carboniferous	Gully Oolite Formation	Off-site immediately southwest.	BGS mapping shows approximately 65,000 m^2 (65 ha) of the formation located off-site to the southwest.
	Limestone: Other Carboniferous	Friars Point Limestone Formation, including the dolomitised limestone and dolomite area and the limestone area.	A small area in the north of the Site to the west of the central region. A thin deposit is also shown off site approximately 80 m southwest on the northern end of the Gully Oolite Formation.	The total area of the Friars Point Limestone Formation is approximately 29,550 m^2 (2.95 ha). Approximately 3,000 m^2 (0.30 ha) of that area is within the Site Boundary.

[5] BGS and Welsh Assembly Government (2010). Mineral Resource Map of Wales, South East Wales, 1:100,000 scale. Available online at: https://nora.nerc.ac.uk/id/eprint/11681/ (Access: August 2026).

[6] British Geological Survey (BGS). GeoIndex Online Map Viewer. Available Online at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ (Access: August 2026).

[7] BGS and Department of the Environment, Transport and the Regions (DETR) (1997). Mineral Resources map (other than coal), South Wales, 1:100,000 scale. Available Online at: https://nora.nerc.ac.uk/id/eprint/539256/1/south_wales_Part1.pdf (Access: August 2026).

Mineral resource category	Mineral resource	Associated geology	Location	Approximate size
	Other Limestone	St Mary's Well Bay Member and Porthkerry Member.	A small area located in the south of the central region of the Site. The larger area of designated resource located in the southeast and along the eastern boundary of the Site. The eastern site parcel is also primarily composed of this mineral.	Three areas around the Site are designated as 'other limestone'; to the east, north and south. In total, there are 4,470,000 m^2 (447 ha) designated as other limestone resource in the vicinity of the Site. In total, approximately 170,000 m^2 (17 ha) of this resource lies within the Site Boundary.
Brick Clay	Brick clay beneath overburden less than five metres	Mercia Mudstone Group (Mudstone) and Blue Anchor Formation (Mudstone)	The brick clay resource located in the central region of the Site.	In total, 790,000 m^2 (79 ha) of brick clay resource lies within a 1 km radius around the Site. (Mapping shows the brick clay resource extending further than 1 km north of the Site and along the shoreline to the east of the Site). Approximately 150,000 m^2 (15 ha) of the brick clay resource lies within the Site Boundary.
Sandstone	Interbedded sandstone and mudstone (GIS only)	Mercia Mudstone Group (Marginal Facies) - Conglomerate	The area of interbedded sandstone and mudstone located in the west of the Site.	Within a 1 km radius of the Site, there is approximately 1,730,000 m^2 (173 ha) (the resource extends further to the north and west). Approximately 40,000 m^2 (4 ha) lies within the Site Boundary.

1.2.7. The following summary of uses for various mineral resources is taken from the BGS South Wales Mineral Resources map (1997)[8]:

- "*Carboniferous limestones are the most important source of coarse aggregate. They form thick, relatively consistent deposits of hard limestone and dolomite, ideally suited to the production of crushed rock aggregates. The limestones are varied both in lithology and thickness, resulting in a complicated succession of formation names. However, most are capable of producing good quality aggregates. In some areas most of the sequence is composed of relatively pure limestone. […] Certain*

[8] BGS and Department of the Environment, Transport and the Regions (DETR) (1997). Mineral Resources map (other than coal), South Wales, 1:100,000 scale. Available Online at: https://nora.nerc.ac.uk/id/eprint/539256/1/south_wales_Part1.pdf (Access: August 2026).

dolomotised beds yield aggregates which have unusually high resistance to abrasion and are utilised for rail ballast;

- *Jurassic limestones [referred to as 'other limestone' in Table 2] occur extensively in the Vale of Glamorgan and consist of relatively thick sequences of interbedded limestones and mudstones. They are not generally suitable for aggregate use except as fill due to their shaly character, but the more limestone-rich parts of the sequence provide material suitable for cement manufacture;* [and]
- *Clay and shale are widely distributed in South Wales and brick manufacture has, in the past, been based on a wide range of resources. These are not shown on the map. There is now only one brick factory in the region, near Ammanford, where production is based on boulder clay and mudstone from the Middle Coal Measures*."

1.2.8. Brick clays are sedimentary mudstones (clay and shale) used in the manufacture of structural clay products including bricks and pipes[9].

1.2.9. The interbedded sandstones and mudstones are considered a Category 3 resource (resources that are of local importance). These are "*not shown on the map face, but are provided in an accompanying GIS. This category represents those resources that may be important for supply locally in some areas, but not in others as better quality materials may be available for use."* (BGS, 2012)[10]. In South Wales, these interbedded sandstones and mudstones are not currently required for local supply because, as the BGS South Wales Mineral Resources Map states, *"Pennant sandstones are the principal sandstone resource and have a large outcrop in the central and eastern parts of the South Wales Coalfield."* The interbedded sandstones and mudstones present at the Site are not part of the Pennant sandstones and therefore are not required for local supply.

Available Borehole Information

1.2.10. Available relevant BGS borehole records from BGS GeoIndex[11] have been reviewed. No BGS borehole records were available within the Site Boundary. Available borehole logs from within the identified mineral resources geological units in the surrounding area have been reviewed. The position of the reviewed boreholes is shown in **Figure 5** (**Annex A**). Logs were not available in the carboniferous limestone resource areas. **Table**

[9] BGS (April 2022). Mineral Planning Factsheet, Brick clay. Available Online at: https://nora.nerc.ac.uk/id/eprint/532490/ (Access: August 2026).

[10] BGS and Welsh Government (2012). Aggregates Safeguarding Maps of Wales, Mineral Resources and Policy Team, Report Reference CR/12/039N. Available Online at: https://nora.nerc.ac.uk/id/eprint/20138/1/Aggregates_Safeguarding_Map_Of_Wales_Final.pdf (Access: August 2026).

[11] British Geological Survey (BGS). GeoIndex Online Map Viewer. Available Online at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ (Access: August 2026).

3 summarises the borehole logs identified and copies of the borehole records are provided in **Annex B**.

Table 3 – Summary of BGS borehole logs

Borehole Record	Approx. Distance from the Site	Geological Unit	Mineral Resource	Summary of Geology
ST16NE65	500 m north (adjacent to ST16NE66)	St Mary's Well Bay Member (interbedded limestone and mudstone)	Other Limestone	Topsoil (no description provided) recorded to 0.40 m below ground level (bgl)*. Then two beds of clay identified; firm light grey and brown clay to 1.10 m bgl and then grey and brown sandy clay with siltstone fragments to 1.85 m bgl. Slightly weathered silty limestone is recorded beneath with beds of shaly mudstone and calcareous siltstone to the base of the borehole at 7.00 m bgl.
ST16NE66	500 m north (adjacent to ST16NE65)	St Mary's Well Bay Member (interbedded limestone and mudstone)	Other Limestone	Topsoil (no description) to 0.35 m bgl. Then two beds of clay; firm light grey/brown clay to 1.20 m bgl with grey and brown sandy clay with siltstone fragments beneath to 1.95 m bgl. Calcareous siltstone was recorded to the base of the borehole at 2.30 m bgl.

Borehole Record	Approx. Distance from the Site	Geological Unit	Mineral Resource	Summary of Geology
ST16NE37	600 m east of the main site and 120 m east of the eastern parcel (Ecology Mitigation Area)	BGS mapping shows the borehole is within the St Mary's Well Bay Member. The borehole log describes the shallower geology as part of the Penarth Group and the deeper geology as part of the Mercia Mudstone Group and Blue Anchor Formation.	Other Limestone	Topsoil (no description) recorded to 0.20 m bgl. To 24.15 m bgl fissile, weak, with discontinuities, sulphurous, fossiliferous and carbonaceous claystone is interbedded with argillaceous slightly weathered limestone. These beds are described as being part of the Penarth Group until 11.40 m bgl where they are attributed to the Mercia Mudstone Group and Blue Anchor Formation. At 24.15 m bgl, a red brown calcareous claystone/mudstone which is moderately strong to moderately weak is described as part of the Mercia Mudstone group: red marls. At 43.25 m bgl, the mudstone/red marls are described as very weak to weak. At 51.30 m bgl, the red marl mudstone/claystone is described as weak to moderately strong, containing gypsum nodules or gypsiferous veins and discontinuities until the base of the borehole at 64.25 m bgl.
ST16NE3	490 m north	Blue Anchor Formation (mudstone)	Brick Clay	The borehole log provides limited detail. Soil is recorded to 0.45 m bgl. Clay beneath to 1.35 m bgl. Clay and red marl underlie this to 3.45 m bgl. White rock is recorded to 8.2 m bgl, then red rock to 8.5 m bgl and then white rock again to approximately 9.30 m bgl at the base of the borehole.
ST16NE26	190 m south	Penarth Group (mudstone and limestone, interbedded)	Not identified as a mineral resource.	Topsoil (no description provided) was recorded to 0.20 m bgl. Sandy then silty clay was recorded beneath to 3.50 m bgl. Then weathered shale to the base of the borehole at 5.30 m bgl.

Borehole Record	Approx. Distance from the Site	Geological Unit	Mineral Resource	Summary of Geology
ST16NE24	210 m south	Mercia Mudstone Group (Marginal Facies) (Conglomerate)	Sandstone (Interbedded sandstone and mudstone)	Topsoil was recorded to 0.20 m bgl over sandy then silty clay to 1.00 m bgl. Beneath these were layers of weathered limestone (to 2.10 m bgl), weathered mudstone (to 3.50 m bgl), weathered sandstone (to 6.85 m bgl), weathered limestone (to 8.00 m bgl) and weathered siltstone to the base of the borehole at 8.60 m bgl.

**m bgl: metres below ground level*

Hydrogeology and Hydrology

1.2.11. The hydrological features identified within the Site Boundary are listed below:

- An unnamed drain (field ditch) is present in the south of the central parcel of the Site which runs south-east and then turns to the south-west along a field boundary;
- An unnamed drain (field ditch) runs along the south-eastern boundary of the Site; and
- There also appears to be a drainage ditch running along St Mary's Well Bay Road through the middle of the main site. This is assumed to flow northwards. Its outfall is unknown and unmapped, but it appears it could connect with a tributary of Sully Brook. This tributary system and connected watercourses are likely field ditches, draining much of the land to the north of Lavernock Road.

1.2.12. The following hydrological features have been identified within the surrounding area:

- A set of field ditches/streams are located between 10 m and 540 m north of the Site;
- Sully Brook (Statutory Main River) is located 250 m north of the Site and orientated approximately east-west in the vicinity of the Site;
- Cosmeston Lakes are located 310 m north of the Site;
- A pond is located 210 m east of the main Site, and immediately adjacent to the eastern parcel (Ecology Mitigation Area); and
- St Marys Well Bay is located approximately 100 m south and 670 m east of the main Site at the closest points, and approximately 200 m east of the eastern parcel (Ecology Mitigation Area).

1.2.13. The groundwater aquifer designations (bedrock and superficial) across the Site and the surrounding area are summarised in **Table 4**. **Figure 6** (**Annex A**) shows the extent of

the bedrock aquifers. The following aquifer designations (Environment Agency, July 2025[12]) are identified:

- Principal Aquifer - strategically important rock units that have high permeability and water storage capacity. They support rivers, lakes and wetlands;
- Secondary A Aquifer - comprise permeable layers that can support local water supplies, and may form an important source of base flow to rivers; and
- Secondary B Aquifer - mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like fissures and openings or eroded layers.

Table 4 – Location of aquifer designations

Aquifer Designation	Geological Units	Location
Bedrock		
Principal Aquifer	Mercia Mudstone Group (Marginal Facies) - Conglomerate Gully Oolite Formation Friars Point Limestone Formation - limestone and dolomite	In the west of the Site.
Secondary A	St Mary's Well Bay Member	In the east and south of the Site.
Secondary B	Mercia Mudstone Group-Mudstone Blue Anchor Formation Penarth Group Lavernock Shale Member	In the centre of the Site.
Superficial		
Secondary A	Beach deposits	200 m south of the Site.
	Alluvium	200 m north of the Site.

1.2.14. The groundwater vulnerability is recorded as high due to the absence of superficial deposits (which may have acted as a barrier if present) and the presence of sensitive aquifers (Principal and Secondary designations) below the Site.

Quarrying, Mining and Mineral Extraction

1.2.15. BGS GeoIndex 'Mines and Quarries' mapping[13] shows records of 'ceased' quarries and pits within the Site or within the surrounding area, as shown on **Figure 5 (Annex A)**.

[12] Environment Agency (July 2025). Guidance: Protect Groundwater and Prevent Groundwater Pollution. Available Online at: https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution (Access: August 2026).

[13] British Geological Survey (BGS). GeoIndex Online Map Viewer. Available Online at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ (Access: August 2026).

The BGS mineral resource map (2010)[14] also identifies several mineral workings described as being '*inactive, worked out and/or restored*', as shown on **Figure 5** (**Annex A**). These are summarised below:

- Hopkins Mount Marl Pit in the west of the Site;
- Cosmeston Road Quarry (2 records) and Gypsum Pit recorded off-site between approximately 10-50 m north close to Lavernock Road (B4267). This matches with the location of a 'Old Quarry' and 'Old Limekiln' shown on historical mapping (1921)[15];
- In the east of the Site is a record named "Sutton". No additional detail is provided. This matches with the location of an 'Old Quarry' and 'Old Limekiln' shown on historical mapping (1921);
- Approximately 70 m south and 200 m southwest of the Site are two records of Hopkins Mount Quarry. Hopkins Mount is the hill located immediately southwest of Site (which is shown as being comprised of the high purity limestone of the Gully Oolite Formation based on geological mapping). Aerial mapping/topography shows a narrow cutting into the hill which likely relates to historical quarrying. This matches with the location of an 'Old Quarry' and 'Old Limekiln' shown on historical mapping (1921);
- A record for Cogan Hall Quarry is located approximately 180 m north-west of Site across Lavernock Road (B4267), this is close to the same location as the record from the BGS Mineral Resource Map (2010)[16] which shows 'Lavernock (limestone)' mineral deposit that is '*inactive, worked out and/or restored*'. This also matches with a record of an 'Old Quarry' shown on historical mapping (1921)[17];
- The BGS mineral resource map (2010) identifies Downswood (limestone) mineral working (inactive, worked out and/or restored) located approximately 450 m north-east of the Site Boundary; and
- The BGS mineral resource map (2010) identifies Cosmeston (limestone) mineral working (inactive, worked out and/or restored) located approximately 1 km north of the Site Boundary.

1.2.16. It is considered that these records primarily relate to historical small scale surface quarrying and lime production.

[14] BGS and Welsh Assembly Government (2010). Mineral Resource Map of Wales, South East Wales, 1:100,000 scale. Available online at: https://nora.nerc.ac.uk/id/eprint/11681/ (Access: August 2026).
[15] National Library of Scotland. Historical Ordnance Survey Maps. Available Online at: https://maps.nls.uk/os/ (Access: August 2026).
[16] BGS and Welsh Assembly Government (2010). Mineral Resource Map of Wales, South East Wales, 1:100,000 scale. Available online at: https://nora.nerc.ac.uk/id/eprint/11681/ (Access: August 2026).
[17] National Library of Scotland. Historical Ordnance Survey Maps. Available Online at: https://maps.nls.uk/os/ (Access: August 2026).

1.2.17. No further information regarding mining or quarrying activities by the Mining Remediation Authority[18] or BGS is provided. The Site is not within a Coal Mining Reporting Area[18].

Sensitive Land Uses

1.2.18. The following sensitive land uses/features have been identified in the vicinity of the Site and are shown on **Figure 7a** and **Figure 7b** in **Annex A**:

- The Site is comprised of agricultural land (Agricultural Land Classifications (ALC) are shown on **Figure 7b** in **Annex A**). The ALC assigned to the Site and surrounding area by Natural Resources Wales (NRW)[19] are:
  - Small areas of non-agricultural land predominantly in the west and north of the Site and to the south outside the Site Boundary;
  - Grade 3b (moderate quality agricultural land) in the west of the Site and the surrounding land to the north, west and south; and
  - Grade 4 (poor quality agricultural land) in the east of the Site. The surrounding land to the east is predominantly also classified as grade 4 with an area of grade 3b further to the east and small areas of non-agricultural land.
- The Penarth Coast Site of Special Scientific Interest (SSSI) is located immediately south-east of the Site;
- The Severn Estuary Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar Site and SSSI are located approximately 550 m east of the Site;
- Cosmeston Lakes Country Park Local Nature Reserve (LNR) is located immediately north of the Site across Lavernock Road (B4267) extending northwards. Within this area, Cosmeston Lakes SSSI is located approximately 300 m north of the Site;
- There is a caravan park located immediately south of the central part of Site, and another caravan park located 150 m east of the eastern edge of the Site;
- Cog Moors SSSI is located 1.5 km north-west of the Site;
- Sully Island located approximately 1 km south of the Site and off the coast classified as a SSSI, Ramsar site and SPA. A scheduled ancient monument is also located on the island; Sully Island Danish Fort;
- There are further Scheduled Monuments within 1 km of the Site. These comprise the Anti-aircraft and Coastal Battery West of Lavernock Point, located approximately 75 m east of the Site, and St Mary's Well Bay Pillbox, located approximately 400 m south of the Site; and

[18] Mining Remediation Authority. Mining Remediation Authority Map Viewer. Available Online at: https://datamine-cauk.hub.arcgis.com/ (Access: August 2026).

[19] Welsh Government and Natural Resources Wales. Data Map Wales Viewer. Available Online at: https://datamap.gov.wales/maps/new#/ (Access: September 2026).

- There are several non-statutory ecological designations within and surrounding the Site (not shown on Figure 7a). Two Sites of Importance for Nature Conservation (SINCs), Lavernock Point East and Ty-r-Orsaf, are located within 20 m of the Site Boundary. The Site also falls within a B-Lines area, a strategically important ecological network established to provide habitat connectivity for pollinating insects through a series of wildflower-rich habitat corridors. In addition, Lavernock Point Nature Reserve is located adjacent to the south-eastern Site Boundary, with part of the reserve overlapping Penarth Coast SSSI. Existing habitats within and around the Site include hedgerows, semi-natural woodland, scattered trees, scrub and grassland habitats, which contribute to the ecological connectivity of the wider landscape.

1.3. Mineral Planning Policy

National Policy

1.3.1. The Future Wales National Plan 2040[20] recognises the dependence on high-quality natural resources and the importance of carefully managing their use and maximising their contribution to society. The mineral and material resource industries are important at a local, regional and national level. Effective planning is key to ensure there is a reliable supply of minerals that can meet demand across Wales when pressure is placed on the industry by planned construction works.

1.3.2. PPW[21] sets out the land-use planning policies of the Welsh Government, and in respect of minerals planning introduces the principle of safeguarding access to mineral resources in order to protect them from permanent sterilisation so that they are available for future generations. PPW advises that safeguarding does not necessarily indicate an acceptance of mineral working, but that the location and quality of the mineral is known and the environmental constraints associated with extraction, including the potential for extraction of mineral resources prior to undertaking other forms of development, should be considered (PPW, **paragraph 14.2.1**).

1.3.3. Consequently, PPW requires that areas to be safeguarded should be identified on the LDP proposals map and LDP policies should protect these potential mineral resources from other types of permanent development which would either sterilise them or hinder extraction, or which may hinder extraction in the future as technology changes.

[20]Welsh Government (February 2021). Future Wales: The National Plan 2040. Available Online at: https://www.gov.wales/future-wales-national-plan-2040 (Access: September 2026).

[21] Welsh Government (July 2024). Planning Policy Wales, Edition 12. Available online at: https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf (Access: September 2026).

1.3.4. Mineral Technical Advice Note 1: Aggregates (2004) (MTAN1)[22] sets out advice on the mechanisms for delivering the policy for aggregates extraction and reiterates the need to safeguard aggregate resources for future generations.

Local Policy

1.3.5. The Vale of Glamorgan LDP 2011-2026[23] provides the local planning policy framework for the Vale of Glamorgan and was adopted by the Vale of Glamorgan Council (hereafter the 'Council') on 28 June 2017.

1.3.6. Accompanying this plan are the proposals map[24] and Minerals Safeguarding Supplementary Planning Guidance[25] which is designed to assist with the consideration of planning applications within MSAs.

1.3.7. The Vale of Glamorgan LDP proposals map identifies the spatial extent of the MSAs (See **Figure 8** in **Annex A**). Policy MG22 (Development in Minerals Safeguarding Areas) provides the Council's framework for the consideration of development proposals in these areas.

1.3.8. The Council is preparing a new LDP to replace the existing adopted LDP. The new Plan will be called the Replacement Local Development Plan (RLDP) (2021-2036)[26]. Until this RLDP is adopted, the 2011-2026 LDP will be used. A review of the minerals section shows that the safeguarding policy (MIN 1 Development in Minerals Safeguarding Areas) has the same wording as the adopted LDP Policy MG22.

[22] Welsh Government (March 2004). Minerals Technical Advice Note Wales 1: Aggregates. Online at: https://www.gov.wales/minerals-technical-advice-note-mtan-wales-1-aggregates (Access: September 2026).

[23] Vale of Glamorgan Council (June 2017). Vale of Glamorgan Local Development Plan 2011-2026, Adopted June 2017. Available Online at: https://www.valeofglamorgan.gov.uk/Documents/Living/Planning/Policy/LDP/LDP-Adoption/Adopted-LDP-Written-Statement-June-2017-final-interactive-web-version.pdf (Access: September 2026).

[24] Vale of Glamorgan Council (June 2017). Vale of Glamorgan Local Development Plan 2011-2026, Proposals Map, (PDF version and Interactive Proposals Map (MyVale Interactive Map)). Available Online at: https://www.valeofglamorgan.gov.uk/en/living/planning_and_building_control/Planning/planning_policy/Planning-Policy.aspx (Access September 2026).

[25] Vale of Glamorgan Council (April 2018). Vale of Glamorgan Local Development Plan 2011-2026 Supplementary Planning Guidance, Minerals Safeguarding. Available Online at: https://www.valeofglamorgan.gov.uk/Documents/Living/Planning/Policy/Minerals-Safeguarding-SPG-2018.pdf (Access: September 2026).

[26] Vale of Glamorgan Council (November 2025). Vale of Glamorgan Replacement Local Development Plan 2021-2036, Deposit Plan. Available Online at: https://www.valeofglamorgan.gov.uk/en/living/planning_and_building_control/Planning/planning_policy/RLDP/Replacement-Local-Development-Plan.aspx (Access September 2026).

Policy MG22 (Development in Minerals Safeguarding Areas)

POLICY MG22 -
DEVELOPMENT IN MINERAL SAFEGUARDING AREAS

Known mineral resources of sandstone, sand and gravel and limestone are safeguarded as shown on the proposals map.

New development will only be permitted in an area of known mineral resource where it has first been demonstrated that:

1. **Any reserves of minerals can be economically extracted prior to the commencement of the development;**
2. **Or extraction would have an unacceptable impact on environmental or amenity considerations; or**
3. **The development would have no significant impact on the possible working of the resource by reason of its nature or size; or**
4. **The resource in question is of poor quality / quantity.**

1.3.9. In summary, the following MSAs are identified within the Site:

- The west of the Site contains three MSAs for Limestone 1, associated with three separate deposits of limestone. Two relate to the Friars Points Limestone Formation 'Limestone: Other Carboniferous' Mineral Resource (two occurrences, one located on-site in the north to the west of the central region, and one occurrence located off-site approximately 80 m southwest, as identified in **Table 2**). And the other is related to the Gully Oolite Formation 'High purity limestone (>97% CaCO3): Carboniferous' Mineral Resource located off-site immediately southwest. This category 1 (resources that are considered of national importance) limestone is considered to be high purity Carboniferous limestone which is predominantly used in low skid resistant roadstone at a national level and which is in short supply in many parts of the UK.
- The east, south and southwest of the main Site and the eastern parcel lies within an MSA for Limestone 2. This relates to the St Mary's Well Bay Member (interbedded limestone and mudstone) 'Limestone: Other' mineral resource. This category 2 (resources considered of regional importance) limestone is referred to as "other limestone resources" and is normally used as an aggregate source. This limestone is considered to be of more than local importance and is found throughout Wales.

1.3.10. Dormant Mineral Sites - Policy MG24 'Dormant Mineral Sites' states that the local authority will prevent further mineral extraction at the locations designated as dormant mineral sites by serving prohibition orders.

1.3.11. The proposals map shows the following Dormant Mineral Site's either on-site or in close vicinity (see **Figure 8** in **Annex A**):

- The south-east of the main Site and western edge of the eastern parcel lies within an area designated as a Dormant Mineral Site, associated with the former

Downswood (Limestone) mineral working approximately 450 m north-east of the main Site (labelled as inactive, worked out and/or restored), discussed in "Quarrying, Mining and Mineral Extraction" section;

- Another Dormant Mineral Site is shown off-site approximately 180 m north-west across the B4267 associated with the former Lavernock (Limestone) mineral working (also referred to as Cogan Hall Quarry) (labelled as inactive, worked out and/or restored) as discussed in **paragraph 1.2.15**; and
- Cosmeston Quarry located approximately 1 km north as discussed in **paragraph 1.2.15**.

Policy MG24 Dormant Mineral Sites (highlighted relevant dormant sites in red)

POLICY MG24 -
DORMANT MINERAL SITES

The Council will seek to prevent further mineral extraction by seeking to serve prohibition orders at the following long dormant mineral sites where it is satisfied that the resumption of winning and working of minerals or the depositing of mineral waste to any substantial extent is unlikely:

1. **Beaupre (Long Grove) Quarry, St Hilary;**
2. **Cnap Twt Quarry, Castle upon Alun;**
3. **Cosmeston Quarry, Penarth;**
4. **Cross Common Quarry, Dinas Powys;**
5. **Downswood Quarry, Penarth;**
6. **Ely Brickworks (site shared with Cardiff);**
7. **Lavernock Quarry;**
8. **St. Andrews Quarry, St Andrews Major;**
9. **Southerndown Road Quarry.**

As the dormant reserves at Argoed Isha, Llansannor have been assessed as having potential to be reworked in the future, the Council will not seek to serve a prohibition order at this site.

1.3.12. The local plan[27] also states the following regarding Dormant Mineral Sites:

- *"In addition to active quarry sites, there are a number of inactive and long dormant mineral sites within the Vale of Glamorgan where no mineral working has occurred for a period in excess of 10 years. These are shown on the Proposals Map. Many of the sites have regenerated naturally, have been put to alternative uses or are constrained by nearby development. For example, Cosmeston Quarry flooded to a depth of over 20 metres when quarrying ceased in the 1960s and has since been incorporated into Cosmeston Country Park; Lavernock Quarry and Southerndown Road have been used as waste disposal sites; and Ely Brickworks (shared with Cardiff) has been largely covered by the Ely Link Road. In addition, approximately 5.4 hectares to the North of Lavernock Quarry has been allocated for residential development under Policy MG2 (24) Land at Upper Cosmeston Farm, Lavernock.*

[27] Vale of Glamorgan Council (June 2017). Vale of Glamorgan Local Development Plan 2011-2026, Adopted June 2017. Available Online at: https://www.valeofglamorgan.gov.uk/Documents/Living/Planning/Policy/LDP/LDP-Adoption/Adopted-LDP-Written-Statement-June-2017-final-interactive-web-version.pdf (access: September 2026).

Reserves at Beaupre, Cnap Twt, Cross Common and Downswood quarries are limited and/or constrained and St Andrews Quarry is constrained by nearby sensitive development.; [and]

- *The Council will seek to prevent further extraction of resources at the sites listed in Policy MG24 in order to provide certainty about their future working and will seek to ensure that restoration is undertaken where appropriate. Restoration and after-use will primarily rely on natural regeneration for nature conservation/ecological purposes. For Lavernock Quarry, residential development will take place on the northern part of the dormant quarry allocated as part of MG2 (24) Land at Upper Cosmeston Farm, Lavernock."*

Consultation

1.3.13. Consultation with a local South Wales limestone quarry operator has been undertaken. A phone call discussion was had on 02 September 2026 between WSP and Heidelberg Materials Quarry Manager (Penderyn Quarry Aberdare). The following pertinent information is noted following the discussion:

- The opinion of the Heidelberg Materials Quarry Manager was that it is unlikely there would be enough material to make it viable to extract, as the Site comprises mostly mudstone or interbedded deposits as shown on geological mapping;
- Previous quarries shown on-site and in the vicinity are from a long time ago, they involved burning lime in kilns, and the extraction process was very different to modern day. The material comprises generally interbedded deposits and material was taken out by hand or using small machines;
- Aberthaw quarry in Barry (approximately 13 km west) extracts a different type of limestone to that shown within the Site from a different limestone formation, which has properties useful in cement production;
- The local authority would be in opposition of any further quarrying in the area, based on the Dormant Mineral Site policy (MG24) in the local plan, it was noted that this would be a critical factor that would restrict extraction permissions.

1.3.14. Local Authority Consultation - WSP contacted a Vale of Glamorgan Council representative on 01 September 2026 to seek comment from the Minerals Planning Team but have not received a response at the time of writing.

1.3.15. Pre-app Advice from the Council was received on 11 March 2026 which is shown below:

Mineral Resource:

Much of the site is within a mineral safeguarding area for Limestone (Category 1 and/or 2). The mineral safeguarding areas are based upon the British Geological Survey (BGS) Aggregate Safeguarding Map for South East Wales. Policy MG22 of the LDP outlines that '*New development will only be permitted in an area of known mineral resource where it has first been demonstrated that:*

1. *Any reserves of minerals can be economically extracted prior to the commencement of the development;*
2. *Or extraction would have an unacceptable impact on environmental or amenity considerations; or*
3. *The development would have no significant impact on the possible working of the resource by reason of its nature or size; or*
4. *The resource in question is of poor quality / quantity*'

The Council would need to be satisfied that the development avoids the unnecessary sterilisation of the mineral resource across the site. The proposal would result in minerals beneath the site being unavailable for use during the lifespan of the development, however it is acknowledged that a development of this nature would have a limited lifespan and would be largely reversible.

Nevertheless, any future application should demonstrate that this would be the case and that the proposal would not sterilise or have any significant long term impacts on the mineral resource. Details of anticipated timescales for decommissioning should be submitted with the planning application to assist with consideration of this policy.

Dormant Mineral Site:

The southeastern parcel is within Lavernock Quarry Dormant Mineral Site. LDP Policy MG24 (Dormant Mineral Site) details that the Council will seek to prevent further mineral extraction at the identified sites. The amplification text further details that the identified sites are inactive and long dormant sites where no mineral working has occurred for a period in excess of 10 years. It notes that:

"*The Council will seek to prevent further extraction of resources at the sites listed in Policy MG24 in order to provide certainty about their future working and will seek to ensure that restoration is undertaken where appropriate. Restoration and after-use will primarily rely on natural regeneration for nature conservation/ecological purposes*"

I will need to discuss this further with Policy colleagues in terms of any implications for the proposed development. Given that the policy seeks to prevent further mineral extraction in the identified sites, I do not foresee there being a conflict in principle with the aims of the policy, albeit consideration may need to be given to restoration objectives as noted.

1.3.16. The Environmental Impact Assessment (EIA) Scoping Opinion was reviewed. Relevant comments are summarised in **Table 5**.

Table 5 – EIA Scoping responses relevant to the Mineral Resource Assessment

EIA Scoping Response	Comments
Most of the Site proposed for development is within a mineral safeguarding area for Limestone (Category 1 and/or 2). The Minerals Safeguarding SPG describes Category 1 resources as being of 'national importance' while Category 2 resources are described as having 'local importance'. Planning policy seeks to safeguard mineral resource and protect them from permanent sterilisation. At the screening stage, the officer report noted that: "*The mineral resources on the site would be unavailable for the lifespan of the development but would generally be reversible and installation methods for the panels can potentially be made so to have a relatively low impact on existing ground conditions, and the above resources it may contain*." However, concern was raised about the substation compound, which would likely involve more intrusive ground works, and the impact this would have the mineral resource. In response, the proposed substation area has been moved further south such that it appears to be outside the designated mineral areas. The application proposes to submit a Mineral Resource Assessment to assess whether the Proposed Development would impact the viability of the resources at the Proposed Development area.	Noted.
The southeastern parcel is located within the Lavernock Quarry Dorman Mineral Site, where LDP Policy MG24 seeks to prevent further mineral extraction. However, it appears that the Site has not been worked for a long period of time and has since naturally restored.	Noted. It is noted that due to boundary changes, the southeastern part of site is located within the Downswood Quarry Dormant Mineral Site. The Lavernock Quarry Dormant Mineral Site is now off-site approximately 180 m northwest. As shown in **Figure 8** in **Annex A**.

1.4. Mineral Resource Assessment

Identified Minerals

1.4.1. The Site is within MSAs related to Limestone 1 and Limestone 2 (**Figure 8** in **Annex A**). Based on the BGS mapping records[28], the Limestone 1 resource relates to three carboniferous limestone deposits – The Friars Point Limestone Formation (Dolomotised limestone and dolomite) (on-site), Friars Point Limestone Formation (Limestone) (on-site and off-site), and the Gully Oolite Formation (off-site). The Limestone 2 resource relates to another limestone deposit present in the south and east (St Mary's Well Bay Member). Due to absence of site-specific ground investigation data, a cautionary assumption is made; that all resources identified under the MSA may be present on-site.

Commercial Viability

Requirement

1.4.2. The most recent SWRAWP Annual Report[29] indicates that the Vale of Glamorgan crushed rock reserves equate to a landbank of around 30 years. This substantially exceeds the minimum 10-year crushed rock landbank generally sought by national minerals planning policy. Therefore, the commercial requirement is deemed low.

Extent and Viability

1.4.3. There is no site-specific data for the Site, however given the absence of superficial deposits, and known historical small mineral quarry workings on the Site and in the vicinity, it is anticipated that the overburden thickness is low.

1.4.4. The spatial extent of the Limestone 1 mineral resource is limited based on review of BGS mapping records. The Friars Point Limestone Formation covers approximately 0.3 ha (0.6% of Site area). Whilst the Limestone 2 resource extends across approximately 17 ha (34% of the Site area), the mapped resource comprises the St Mary's Well Bay Member, which is characterised by interbedded limestone and mudstone deposits. Consequently, the presence of a relatively large, mapped resource area does not necessarily equate to a commercially viable limestone reserve. The fragmented geological nature of the deposit, together with the significant proportion of non-limestone material, is considered likely to constrain its economic potential.

[28] British Geological Survey (BGS). GeoIndex Online Map Viewer. Available Online at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ (Access: August 2026).

[29] South Wales Regional Aggregates Working Party (SWRAWP) (January 2026). Annual Report 2024. Available Online at: http://www.swrawp-wales.org.uk/Html/SWRAWP%20Annual%20Report%202024%20.pdf (Access: Sept. 2026).

1.4.5. The nature of the geological strata on the Site and surrounding area (faulted, many fragmented, isolated, geological units, interbedded deposits) means that the extent and workability of mineral deposits is limited.

1.4.6. Based on discussions with a local limestone quarry operator (see **paragraph 1.3.13**) it is considered that the Site is unlikely to be viable for mineral working due to the limited amount of limestone resource present and nature of the geology (small/fragmented mineral resource units including mudstone and interbedded deposits which would not be suitable for extraction).

Nature of Development

1.4.7. The Proposed Development would have an operational lifespan of approximately 40 years and is therefore considered a temporary form of development. Upon cessation of operation, the Site would either be repowered, subject to separate planning consent, or decommissioned and restored to agricultural use. As a result, the Proposed Development would not result in the permanent sterilisation of safeguarded mineral resources and would not prevent potential future extraction following decommissioning.

Prior or Incidental Extraction

1.4.8. Prior extraction is unlikely due to the following factors:

- As the Site is considered temporary, and long-term sterilisation of the resource would not take place, there would be no need for prior extraction of the resource;
- The local authority's prohibitive position on extraction in the area, based on the dormant mineral site policy;
- The limited size and nature (small areas of resource, discontinuous, interbedded limestone and mudstone) of the mineral resource deposits on-site, supported by local quarry operator's view, mean that prior extraction would not be economically viable, as discussed in **paragraphs 1.4.4, 1.4.5 and 1.4.6** above; and
- Sensitive receptors in the immediate area (e.g. SSSIs), it is considered that prior extraction would have detrimental impact on the sensitive receptor.

1.4.9. Incidental extraction is unlikely due to the nature of the Proposed Development. There will be limited excavation across the majority of the Site as the solar panels are ground mounted. In the area of the Project Substation Compound, which includes the substation and BESS development (shown on the **Figure 2** in the centre of the site) excavation would take place in this area, however this is an area with no limestone mineral resources present based on BGS mapping[30]. The substation was deliberately

[30] British Geological Survey (BGS). GeoIndex Online Map Viewer. Available Online at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ (Access: August 2026).

moved to site outside of the MSAs following EIA scoping opinion feedback (see **Table 5** in **paragraphs 1.3.16**).

Existing Sterilisation

1.4.10. There is limited existing sterilisation of the mineral resource identified, as the Site comprises undeveloped farmers' fields.

Policy MG22 Summary

1.4.11. Policy MG22 is presented below, and a discussion is given around criteria that must be demonstrated to allow new development in mineral safeguarding areas.

Policy MG22 (Development in Minerals Safeguarding Areas)

POLICY MG22 -
DEVELOPMENT IN MINERAL SAFEGUARDING AREAS

Known mineral resources of sandstone, sand and gravel and limestone are safeguarded as shown on the proposals map.

New development will only be permitted in an area of known mineral resource where it has first been demonstrated that:

1. **Any reserves of minerals can be economically extracted prior to the commencement of the development;**
2. **Or extraction would have an unacceptable impact on environmental or amenity considerations; or**
3. **The development would have no significant impact on the possible working of the resource by reason of its nature or size; or**
4. **The resource in question is of poor quality / quantity.**

1. Any reserves of minerals can be economically extracted prior to commencement of development.

1.4.12. This cannot be demonstrated as outlined in **paragraph 1.4.8** above.

2. Or extraction would have unacceptable impact on environmental or amenity considerations.

1.4.13. Sensitive receptors are in the immediate area (e.g. SSSIs). In view of the large extent of potential aggregate resources in Wales, the Welsh Government considers that future proposals for aggregate extraction are unlikely to be acceptable where there would be significant adverse effects on a SSSI[31].

1.4.14. Groundwater vulnerability is high due to the presence of sensitive bedrock aquifers with no superficial deposits offering protection, therefore quarrying extraction of the mineral resource would potentially have a negative effect on the Principal Aquifer groundwater environment.

[31]Welsh Government (March 2004). Minerals Technical Advice Note Wales 1: Aggregates. Online at: https://www.gov.wales/minerals-technical-advice-note-mtan-wales-1-aggregates (Access: September 2026).

3. The development would have no significant impact on the possible working of the resource by reason of its nature or size.

1.4.15. The Proposed Development is considered temporary with an operational lifespan of 40 years, following this time the development would be decommissioned and returned to existing land use. As such, the Proposed Development would have little significant impact on working of the resource in the future.

1.4.16. Vale of Glamorgan LDP Supplementary Planning Advice provides guidance on demonstrating development would not have a Significant Impact on the Mineral Resource: '*There are some types of minor development for which the sterilisation of a minerals resource is likely to be negligible and which therefore satisfy the requirements of Policy MG22, these include temporary planning permission where the site will be restored'.*

4. The resource in question is of poor quality/quantity.

1.4.17. The Limestone 1 resource is restricted to small, isolated areas comprising approximately 0.3 ha in total, whilst the more extensive Limestone 2 resource is associated with geological formations characterised by interbedded limestone and mudstone rather than a laterally extensive, homogeneous limestone deposit. The geological complexity of the area, including faulting, fragmented resource blocks and lithological variability, is likely to constrain the practicality and economic viability of extraction.

1.4.18. Furthermore, discussions with an experienced local quarry operator indicated that the quantity and nature of the mineral resource are unlikely to justify commercial working and that the resource does not compare favourably with operational limestone quarries elsewhere in the region.

1.4.19. This conclusion is reinforced by the substantial crushed rock landbank currently available within the Vale of Glamorgan and the wider South Wales region, which reduces any foreseeable requirement to bring relatively constrained resources such as those beneath the Site into production.

1.5. Conclusions

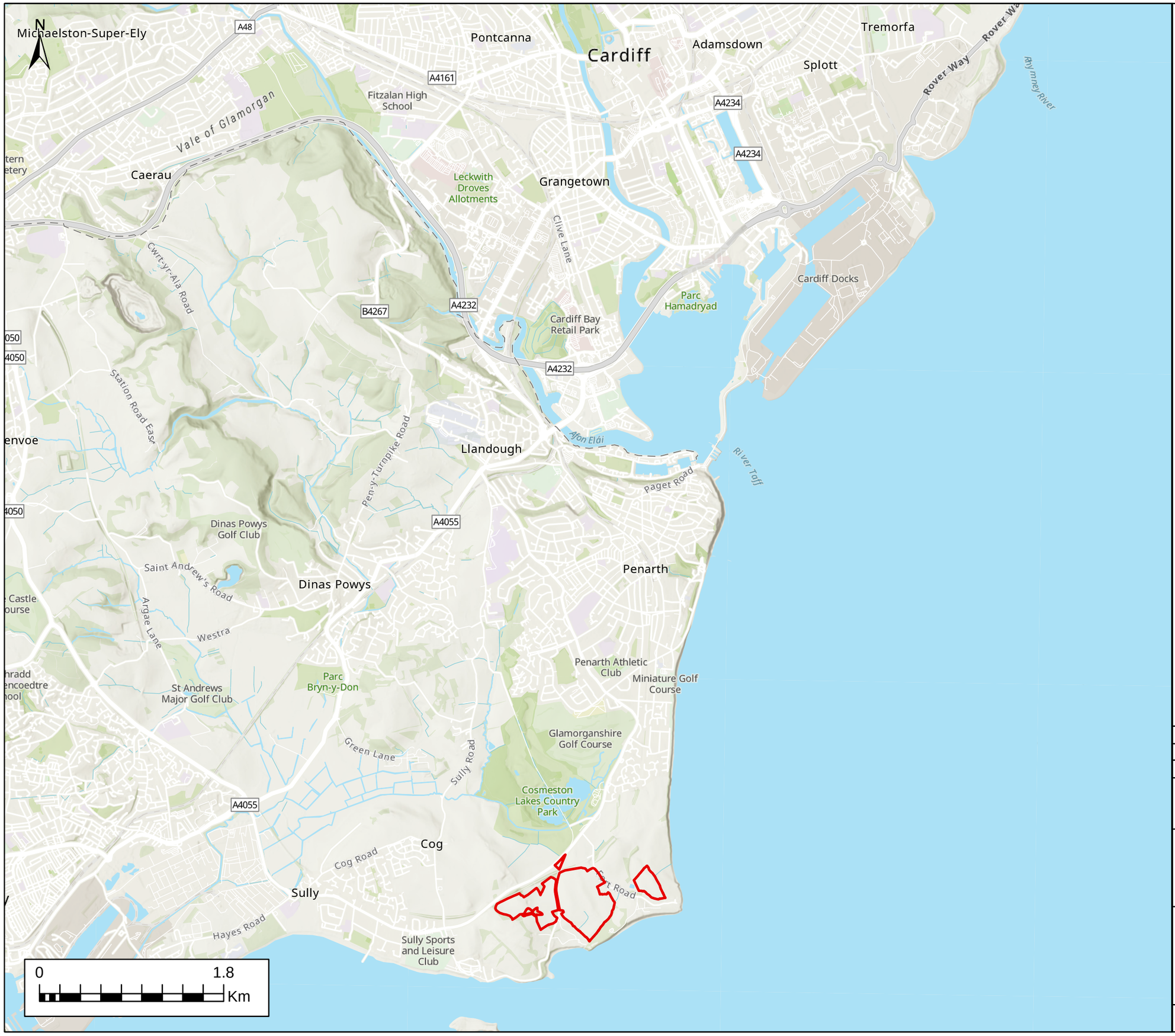
1.5.1. Mineral resources have been identified on-site including limestone, brick clay and sandstone.

1.5.2. The Site is within a MSA for Limestone 1 and Limestone 2 under the Vale of Glamorgan LDP.

1.5.3. Although the Site lies partially within Limestone 1 and Limestone 2 MSAs, the Proposed Development is temporary in nature and would not permanently sterilise safeguarded mineral resources. Following decommissioning, the land would remain available for future alternative uses, including any future consideration of mineral extraction. Furthermore, the identified limestone resources are limited in extent and/or constrained by their geological characteristics, while discussions with a local quarry operator indicate that extraction is unlikely to be commercially viable. On this basis, the Proposed Development is considered consistent with the objectives of Policy MG22, particularly in demonstrating that the development would have no significant impact on the future working of the safeguarded resource by reason of its nature and temporary duration.

1.5.4. In addition, the minerals planning context indicates that the likelihood of future mineral extraction within the area is limited. The Vale of Glamorgan LDP identifies a number of former limestone workings in the vicinity as Dormant Mineral Sites under Policy MG24, including sites immediately northwest of the Site and partly overlapping the eastern extent of the Site. The supporting text to Policy MG24 (and EIA scoping and pre-app feedback) confirms the Council's intention to prevent further mineral extraction at these locations through the use of prohibition orders. Whilst Policy MG24 does not apply directly to all safeguarded mineral resources within the Site, it provides clear evidence of the Council's strategic approach towards former mineral workings in this locality and demonstrates a general reluctance to facilitate the reactivation of historic quarrying interests in the area. This planning context further reduces the likelihood that the safeguarded mineral resource beneath the Site would be worked in the foreseeable future.

Annex A – Figures



LEGEND

Site Boundary



Esri, Intermap, NASA, NGA, USGS, Contains OS data © Crown Copyright and database right 2020, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Rev.	Date:	Revision Description	Drawn	Check	Rev.	App.
0	19/10/2026	Initial Issue	DD	RN	MM	RN
Scale @ A3		Scale: 1:35,500			DO NOT SCALE	

Project:

Larnog Solar Farm Mineral Resource Assessment

Drawing Title:

Site Location Map

Trydan Gwyrdd Cymru

Drawing No.

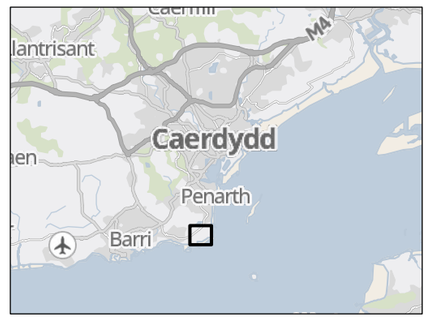
Figure 1

N

0 200 m

Legend

- Site Boundary
- Transformer Station
- Solar PV Array
- Site Access Track
- Attenuation Pond
- Ecology Mitigation Area
- Substation and Battery Energy Storage Systems (BESS) Compound
- Construction Access Point (will become Permanent once Proposed Development is operational)
- Construction Access Point
- Access Gates
- Solar Fencing
- Substation Fencing
- Existing Electricity (High Voltage) - Overhead Line
- Existing Watermain



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Rev.	Date	Revision Description	Drawn	Check	Rev.	App.
0	02/11/2026	Initial Issue	AR	RJ	DP	SM

Scale @ A3 — Scale: 1:5,500 — DO NOT SCALE

Project: Fferm Solar Larnog

Drawing Title: Indicative Site Layout

Trydan Gwyrdd Cymru

Drawing No.: Figure 5.1



LEGEND

- Site Boundary
- Alluvium
- Beach Deposit
- Artificial/Made Ground



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Rev.	Date:	Revision Description	Drawn	Check	Rev.	App.
0	19/10/2026	Initial Issue	DD	NR	MM	NR

Scale @ A3: Scale: 1:6,000 DO NOT SCALE

Project:

Larnog Solar Farm Mineral Resource Assessment

Drawing Title:

Artificial and Superficial Deposits

Trydan Gwyrdd Cymru

Drawing No.

Figure 3

N

Friars Point Limestone Formation - Dolomotised limestone and dolomite

Mercia Mudstone Group - Mudstone

Friars Point Limestone Formation - Limestone

Blue Anchor Formation - Mudstone

Gully Oolite Formation

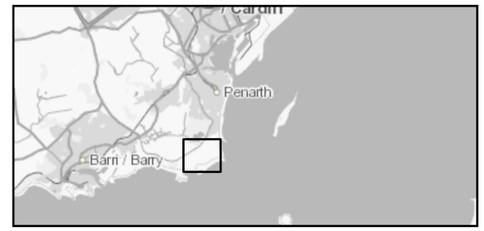
Mercia Mudstone Group (Marginal Facies) - Conglomerate

Bristol Channel

0 200 m

LEGEND

- Faults
- Site Boundary
- Lavernock Shale Member - Mudstone
- Mercia Mudstone Group
- Penarth Group - Mudstone and limestone, interbedded
- Blue Anchor Formation - Mudstone
- St Mary's Well Bay Member - Interbedded limestone and mudstone
- Gully Oolite Formation - Ooid-limestone
- Friars Point Limestone Formation - Limestone
- Friars Point Limestone Formation - Dolomotised limestone and dolomite



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Rev.	Date:	Revision Description	Drawn	Check	Rev.	App.
0	21/10/2026	Initial Issue	DD	NR	MM	NR

Scale @ A3: Scale: 1:6,000 DO NOT SCALE

Project:

Larnog Solar Farm Mineral Resource Assessment

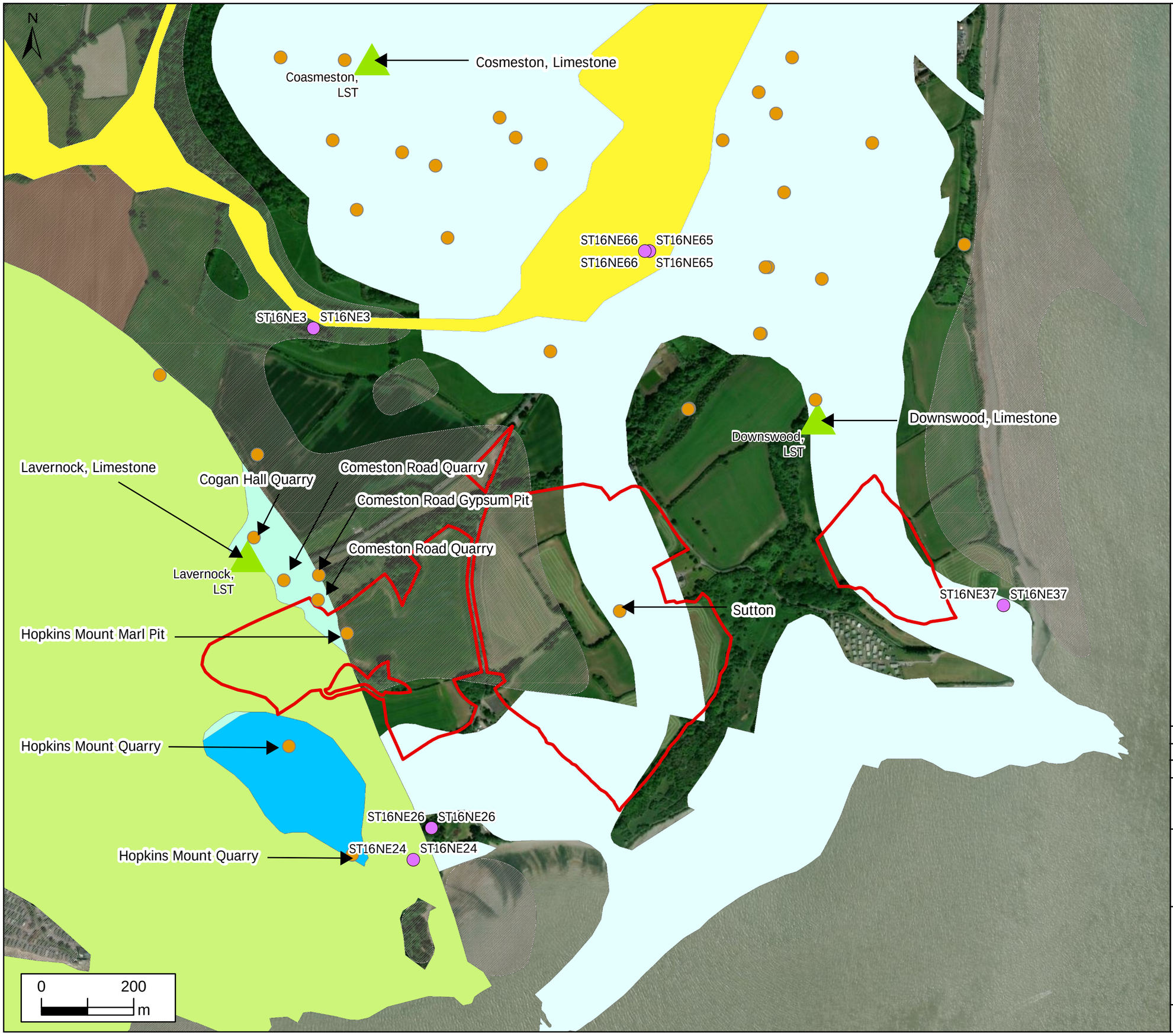
Drawing Title:

Bedrock Geology and Faults

Trydan Gwyrdd Cymru

Drawing No.

Figure 4



LEGEND

- Mineral Workings(Status 'Ceased') (BGS GeoIndex)
- BGS Boreholes Reviewed
- Mineral Workings - Inactive, worked out and/or restored. (BGS, 2010)
- Site Boundary

Mineral Resources

- High Purity Limestone: Carboniferous
- Sandstone - Interbedded Sandstone and Mudstone
- Sand and Gravel - Sub-Alluvial
- Brick Clay
- Other Limestone
- Limestone: Other Carboniferous



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Project:

Larnog Solar Farm Mineral Resource Assessment

Drawing Title:

Mineral Information

Trydan Gwyrdd Cymru

Drawing No.

Figure 5

N

Cosmeston Medieval Village

B4267

B4267

B4267

East Drive

Fort Road

Lavern

0 200 m

LEGEND

Site Boundary

Aquifer Designations

Principal Aquifer

Secondary A

Secondary B



Sources: Esri, Vantor, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap, and the GIS user community, Contains OS data © Crown Copyright and database right 2020, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

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Scale @ A3		Scale: 1:6,000			DO NOT SCALE	

Project:

Larnog Solar Farm Mineral Resource Assessment

Drawing Title:

Bedrock Aquifer Designations

Trydan Gwyrdd Cymru

Drawing No.

Figure 6

Cog Moors

N

Sully Brook

Llynnoedd Cosmeston / Cosmeston Lakes

COSMESTON LAKES COUNTRY PARK

Severn Estuary (Wales)

Severn Estuary

Severn Estuary (Wales)

Cog

B4267

Swanbridge Road

B4267

Anti-aircraft and Coastal Battery West of Lavernock Point

Severn Estuary (Wales)

Sensitive Land Uses

South Road

Sully Sports and Leisure Club

Beach Road

Penarth Coast

St Mary's Well Bay Pillbox

Swanbridge

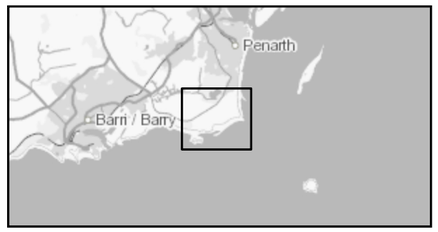
Sully Island, "Danish" Fort

Sully Island

0 200 m

LEGEND

- Site Boundary
- Scheduled Monuments
- Ramsar Sites
- Special Area of Conservation
- Special Protection Areas
- Sites of Special Scientific Interest
- Local Nature Reserve



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Project:

Larnog Solar Farm Mineral Resource Assessment

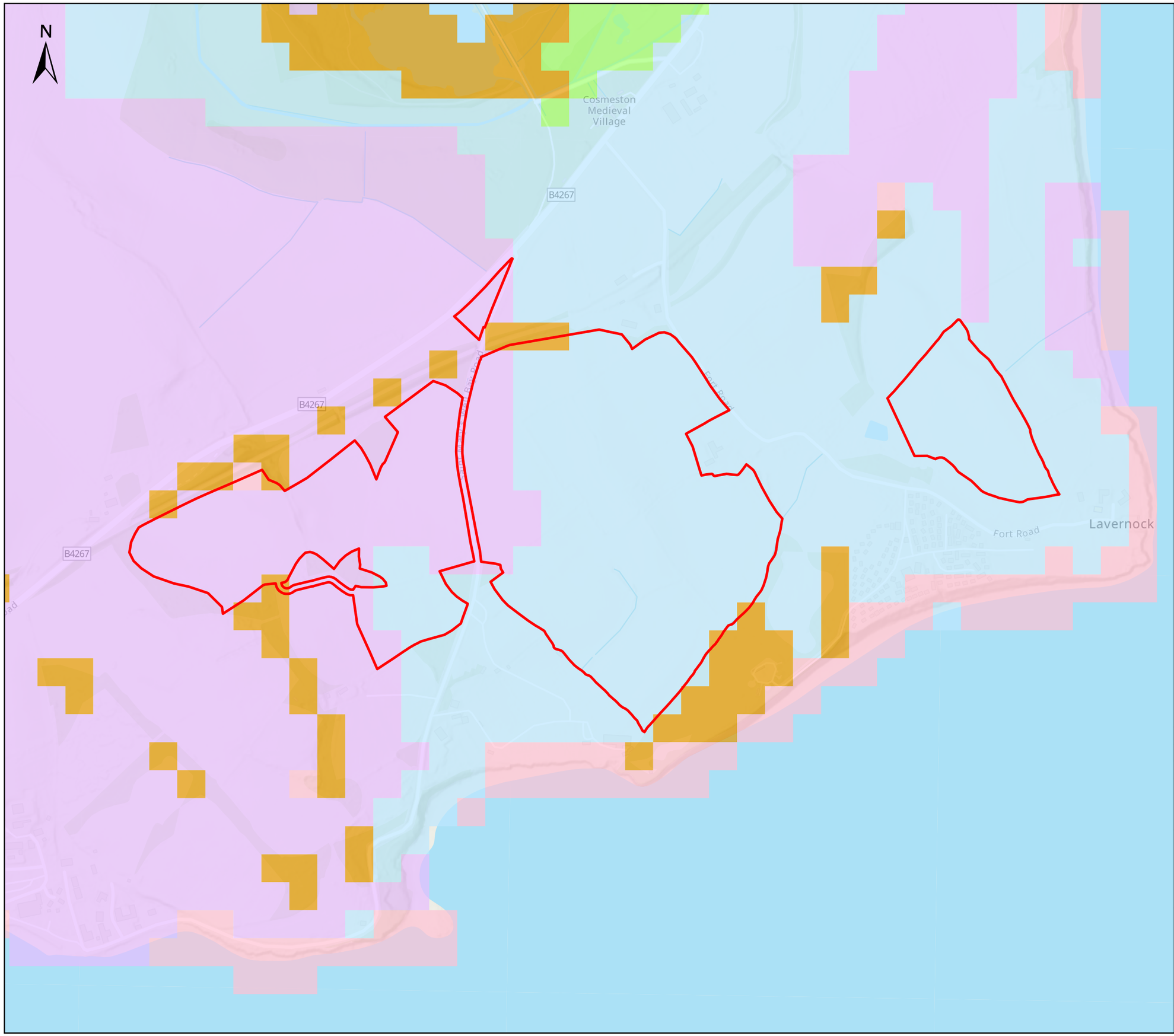
Drawing Title:

Sensitive Land Uses

Trydan Gwyrdd Cymru

Drawing No.

Figure 7a



LEGEND

- Site Boundary

Predictive Agricultural Land Classification

- Grade 1
- Grade 2
- Grade 3a
- Grade 3b
- Grade 4
- Grade 5
- Non Agricultural
- Grade U



Sources: Esri, Vantor, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap, and the GIS user community, Contains OS data © Crown Copyright and database right 2020, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

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0	21/10/2026	Initial Issue	DD	NR	MM	NR

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Project:

Larnog Solar Farm Mineral Resource Assessment

Drawing Title:

Predictive agricultural land classification

Trydan Gwyrdd Cymru

Drawing No.

Figure 7b

N

3. Cosmeston Quarry, Penarth

5. Downswood Quarry, Penarth

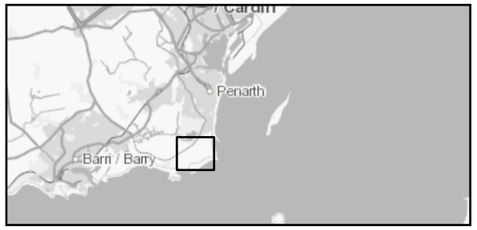
7. Lavernock Quarry

Lavernock

0 200 m

LEGEND

- Site Boundary
- Dormant Mineral Site
- Mineral Safeguarding Limestone 1
- Mineral Safeguarding Limestone 2



Sources: Esri, Vantor, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap, and the GIS user community, Contains OS data © Crown Copyright and database right 2020, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

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Project:

Larnog Solar Farm Mineral Resource Assessment

Drawing Title:

Mineral Safeguarding Areas and Dormant Mineral Sites

Trydan Gwyrdd Cymru

Drawing No.

Figure 8

Annex B – BGS Borehole Records Reviewed

British Geological Survey

BGS ID: 377857 : BGS Reference: ST16NE65
British National Grid (27700) : 317900,169050

Norwest Holst Soil Engineering Ltd.

Borehole No. 9

BOREHOLE LOG

Contract No. F6591
Location Penarth (Cosmeston)
Client Welsh Water Authority
Method of Boring Percussion and Rotary Coring
Diameter of Borehole 150mm/100m

ST 16 NE 65

Sheet 1 of 1
Chainage
Ground Level m.A.O.D.
Date 5/8/85

Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
TOPSOIL		0.40			0.50 (41)		
Firm light grey and brown mottled CLAY		1.10			1.50	81	
Grey brown laminated sandy CLAY with weathered siltstone fragments		1.85			2.30		
Moderately to slightly weathered light grey silty LIMESTONE moderately strong to strong with bands of dark grey black shaly mudstone, weak, and moderately weak calcareous siltstone (solid core lengths generally 75mm)					94	25	
					4.00		
					95	50	
		7.00			7.00		

Type of Sample

Is	S.P.T.	■	Undisturbed
Ic.	C.P.T.	×	Vane
O	Jar	Δ	Water
●	Bulk		Piezometer

Remarks (Observations of Ground Water etc.)

Water struck 5.8.85 1.85 m
Water Level 5.8.85 0.90 m
Water Level 12.9.85 1.90 m

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Contact BGS: ngdc@bgs.ac.uk

British Geological Survey

BGS ID: 377858 : BGS Reference: ST16NE66
British National Grid (27700) : 317890,169050

Norwest Holst Soil Engineering Ltd.

Borehole No. 10

BOREHOLE LOG

Contract No. F6591
Location. Penarth (Cosmeston)
Client. Welsh Water Authority
Method of Boring. Percussion
Diameter of Borehole. 150mm

ST 16 NE
66

Sheet 1 of 1
Chainage.
Ground Level. m.A.O.D.
Date. 5.8.85

Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
TOPSOIL		0.35			0.50 (39)		
Firm light grey/brown mottled silty CLAY		1.20			1.50	95	
Grey and brown laminated sandy CLAY with weathered siltstone fragments		1.95					
Dark grey calcareous SILTSTONE		2.30					

Type of Sample

- Is S.P.T. — Undisturbed
- Ic. C.P.T. — Vane
- O Jar — Δ Water
- ● Bulk — Piezometer

Remarks (Observations of Ground Water etc.)

Water struck 5.8.85 at 1.95 m.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Contact BGS: ngdc@bgs.ac.uk

British Geological Survey

BGS ID: 377829 : BGS Reference: ST16NE37
British National Grid (27700) : 318680,168270

ST 16 NE/57

OSIRIS-CESCO LTD.

SITE INVESTIGATION DIVISION

BOREHOLE No: LBH1

REPORT No: D83070

DRILLING METHOD: Rotary - Air Flush

GROUND/BED LEVEL: +19.11m. O.D.

CO-ORDINATES/ CHAINAGE: 1868E 6827N

DRILLING COMMENCED: 13/6/83

DRILLING COMPLETED: 22/6/83

MACHINE: Craelius B40L

CORE BARREL AND BIT DESIGN: SWF T/C to 12.00m. PWF T/C to 17.50m. 412 SS Diamond to 64.25m.

ORIENTATION: Vertical

LOCATION: LAVERNOCK POINT

CLIENT: WELSH WATER AUTHORITY

Sampling/Test Results	Run Number (Drilling Times)	Circ. Return %	Total Recovery %	Solid Core Recovery %	RQD %	Fracture Frequency (m)	Detail	Point-load Strength Is50 (MPa)	Weathering Grade	Description	Downhole Depth & Change of Strata (m)	Elevation m. O.D. (N)	Instrumentation/ Symbolic Log
	MINS	0 100	0 100	0 100	0 100	0 10		MPa 0 10	I VI				
										TOPSOIL.	0.20	+18.91	
	(42)		Open Hole						VI	Brown/yellow green, completely weathered fissile CLAYSTONE.			
									V		2.00		
	1 (38)	100	0	0	0	-			III to IV	Black with yellow staining; extremely closely to very closely spaced smooth discontinuities with FeO and calcite on surfaces; moderately to highly weathered; sulphurous, fossiliferous, carbonaceous fissile CLAYSTONE; weak to very weak. (PENARTH GROUP: LILSTOCK/ WESTBURY FORMATION).			
CR	2 (45)	100	58	21	11	-				Shelly coarse sandy with small bone fragments.	4.00		
							Closely spaced, smooth.		II	Grey argillaceous slightly weathered LIMESTONE; very strong.	4.58	+14.53	
Casing 14/6/83	3 (52)	100	27	15	10	-					4.83	+14.28	
	14/6/83								II to III	Black; extremely closely to very closely spaced smooth discontinuities with FeO and calcite on surfaces; slightly to moderately weathered; fossiliferous, carbonaceous fissile CLAYSTONE, weak to moderately strong. Occasional very thin fine sandstone horizons. (PENARTH GROUP: WESTBURY FORMATION)			
CR	4 (67)	100	47	45	17	-					6.00		
	5 (48)	100	81	18	0	-							
Casing 15/6/83	6 (62)	100	95	85	66	-				Light to mid-grey; thinly to medium/...	8.00	+11.11	

KEY: SAMPLES:
U = Undisturbed.
B = Bulk Disturbed.
D = Disturbed.
P = Piston.
W = Water.

STANDARD PENETRATION TEST:
S = Hollow Shoe.
C = Cone Point.
R = Refer to text or explanatory data sheet.
( ) No. of blows to drive U sample
f = fine. m = medium c = coarse

REMARKS:

Weaker claystones removed by flush during drilling.

LOGGED BY: J. MILLSON

SCALE: 1:50

SHEET 1 OF 7

Contact BGS: ngdc@bgs.ac.uk

British Geological Survey

BGS ID: 377829 : BGS Reference: ST16NE37
British National Grid (27700) : 318680,168270

ST 16 NE/37

OSIRIS-CESCO LTD.

SITE INVESTIGATION DIVISION

BOREHOLE No: LBH1
Continuation Sheet No: 1
REPORT No: D83070

LOCATION: LAVERNOCK POINT

Sampling/Test Results	Run Number (Drill Time)	Circ. Return	Total Recovery %	Solid Core Recovery %	RQD %	Fracture Frequency (/m)	Detail	Point Load Strength Is 50 (MPa)	Weathering Grade	Description	Downhole Depth & Change of Strata (m)	Elevation m. O.D. (N.)	Instrumentation/ Symbolic Log
	MINS	0 100	0 100	0 100	0 100	0 10		MPa 0 10	I VI				
							Sub-vertical joint.	3.18	II	Light to mid-grey; thinly to medium interbedded; slightly weathered argillaceous LIMESTONE and slightly to highly weathered; calcareous CLAY-STONE.			
	15/6/83						Very fractured clay-stone.		II to IV	Limestone - very strong, occasional sub-vertical discontinuities.			
	7 (56)	100	75	51	38	-	Sub-vertical joint.			Claystone - weak to moderately strong with very closely spaced, smooth, iron stained discontinuities. (PENARTH GROUP: WESTBURY FORMATION)	10.00 10.50	+8.61	
	8 (68)	100	79	60	48	-	Closely to v. closely spaced.	2.90	I to II	Light to mid grey; thinly to medium bedded, slightly weathered argillaceous LIMESTONE; very strong, with thin (<100 mm) interbedded calcareous CLAYSTONE; weak to moderately strong; FeO stained discontinuities. (MERCIA MUDSTONE GROUP: BLUE ANCHOR FORMATION)	11.40	+7.71	
							Closely spaced bedding 10-20°.	0.55	II to III	Light grey; calcareous CLAYSTONE.	11.57	+7.54	
							Sub-vertical joints. (70 to 90°)		II	Light grey; argillaceous LIMESTONE.	12.00		
	9 (48)	100	27	20	7	-			(IV)	Very poor core recovery, probably SHALES with interbedded LIMESTONES.			
CR	10 (39)	100	56	34	0	-			II	Grey-green; thinly to medium bedded slightly weathered; argillaceous LIMESTONE; very strong.	14.00	+5.11	
	16/6/83								II	Grey green; calcareous CLAYSTONE; moderately strong; no discontinuities.	14.30	+4.81	
	11 (49)	100	77	45	10	-	Gravel and clay. recovery.		IV	Grey green calcareous shaley CLAYSTONE extremely closely to very closely spaced, smooth FeO stained discontinuities.	14.95	+4.16	
							70° discontinuity, Very fractured.	0.95	II to III				
	12 (56)	100	73	50	22	-			II to IV	Grey green; calcareous CLAYSTONE; moderately strong to strong; v. closely spaced discontinuities.	15.50	+3.61	
							Gravel and clay recovery		III	CLAYSTONE; ex. to v. closely spac. discon.	15.68	+3.43	
							Clay filled subvertical fractures.		IV	Calcareous CLAYSTONE; porous vuggy calcite horizon (5cm).	16.00	+3.11	
	13 (43)	100	70	30	0	-			IV	CLAYSTONE; extremely fractured, very weak.	16.40	+2.71	
CR	14 (40)	100	27	20	0	-	Fractures at 60-70°.		II	Light olive-grey with reddened horizons; very closely spaced discontinuities; tight sub-vertical Ca and MnO coated; generally slightly weathered with moderately to highly weathered bands; calcareous CLAYSTONE; moderately strong to weak. (MERCIA MUDSTONE GROUP: (BLUE ANCHOR FORMATION).			
Casing 16/6/83	15 (51)	100 lost	0	0	0	-			IV to V	Assumed highly to completely weathered.	18.00		
										Driller reports void 18.30-18.50m.			

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W = Water.

STANDARD PENETRATION TEST:
S = Hollow Shoe.
C = Cone Point.
R = Refer to text or explanatory data sheet.
( ) No. of blows to drive U sample.
f = fine. m = medium. c = coarse

REMARKS:
Some core loss of fissile claystones in fractured zones Run Nos. 7, 9, 14, 15, due to erosion of core by flush.
Core recovery as "clay gravel or cobbles" indicates in-situ fractured and decomposed rock and gives size of individual fragments of brecciated horizon.

LOGGED BY: J. MILLSON SCALE: 1:50 SHEET 2 OF 7

114

Contact BGS: ngdc@bgs.ac.uk

British Geological Survey

BGS ID: 377829 : BGS Reference: ST16NE37
British National Grid (27700) : 318680,168270

ST 16 NE/37

OSIRIS-CESCO LTD.

SITE INVESTIGATION DIVISION

BOREHOLE No: LBH1
Continuation Sheet No: 2
REPORT No: D83070

LOCATION: LAVERNOCK POINT

Sampling/Test Results	Run Number (Drill Time)	Circ. Return	Total Recovery	Solid Core Recovery	RQD	Fracture Frequency	Detail	Point Load Strength Is 50 (MPa)	Weathering Grade	Description	Downhole Depth & Change of Strata (m)	Elevation m. O.D. (N.)	Instrumentation/ Symbolic Log
	MINS	% 0 100	% 0 100	% 0 100	% 0 100	(/m) 0 10		MPa 0 10	I VI				
										(As above)			
	17/6/83							0.25					
	16 (38)	100 Lost	95	95	35	-		0.63 0.55	II				
										Becomes less calcareous; discontinuities v. closely spaced to extremely closely spaced.	20.00		
CR	17 (45)	0	52	33	10	-	Ex closely spaced. Recovered as gravel.			Discontinuities open.			
							Recov. as gravel.		III	Extremely closely spaced fractures.			
	18 (59)	0 100	73	55	35	-			II				
									III	Extremely fractured; open; less calcareous.	22.00		
							Recovered as gravel.		I				
									III	Extremely closely spaced fractures; open; partly clay filled.			
									IV				
									II	Red-brown; fractures v closely spaced, tight.			
Casing 17/6/83	19 (68)	100	74	45	21	-	Clay-filled fractures.		IV	Ex. closely spaced fractures, v weak to weak.			
							Sub-vertical joint (80-90°)		II	Red and grey mottled; fractures v. closely to closely spaced, open FeO stained; mod weak to mod strong.			
CR							Recovered as gravel and cobbles.		III	Fractures v. closely spaced, open, smooth.	24.15	-5.04	
	20 (71)	100	92	77	61	-				Red brown and grey; well developed sub vertical (70-90°) fracture set; very closely to closely spaced with smooth MnO and FeO coated surfaces; calcareous CLAYSTONE/MUDSTONE; mod strong to mod weak. (MERCIA MUDSTONE GROUP: RED MARLS) Minor calcite veining along joint.			
								0.58					
	21 (75)	100	84	66	63	-			II	Becoming predominantly red in colour.	26.00		
	18/6/83												
CR	22 (68)	100	83	83	70	-					28.00		

KEY: SAMPLES:
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W = Water.

STANDARD PENETRATION TEST:
S = Hollow Shoe.
C = Cone Point
R = Refer to text or explanatory data sheet.
( ) No. of blows to drive U sample
f = fine. m = medium. c = coarse

REMARKS:
Foul water hit at 21.70m. depth: sample taken by W.W.A.
Some loss of core due to voided zones to 22.00m depth.

LOGGED BY: J. MILLSON SCALE: 1:50 SHEET 3 OF 7

114

Contact BGS: ngdc@bgs.ac.uk

British Geological Survey

BGS ID: 377829 : BGS Reference: ST16NE37
British National Grid (27700) : 318680,168270

ST 16 NE/37

OSIRIS-CESCO LTD.

SITE INVESTIGATION DIVISION

BOREHOLE No: LBH1
Continuation Sheet No: 3
REPORT No: D83072

LOCATION: LAVERNOCK POINT

Sampling/Test Results	Run Number (Drill Time)	Circ. Return	Total Recovery	Solid Core Recovery	RQD	Fracture Frequency	Detail	Point Load Strength, Is (MPa)	Weathering Grade	Description	Downhole Depth & Change of Strata (m)	Elevation m. O.D. (N)	Instrumentation/ Symbolic Log
	MINS	% 0 100	% 0 100	% 0 100	% 0 100	(/m) 0 10		MPa 0 10	I VI				
Casing 18/6/83	23 (59)	100	78	48	40	-	Fracture, sub-vertical & 2 joint sets @ 60°.		II	(As above) RED MARL; fractures v. closely spaced, tight and open; mod. strong.			
							Recovered as gravel and cobble.		II to III	Fractures v. closely spaced to extremely closely spaced, open MnO coated.			
	24 (53)	100	87	42	12	-	Recovered as gravel & clay. Fractures d0-80°.		II III to IV	Slight grey green mottling; extremely closely spaced and v. closely spaced, open, MnO coated.	30.00		
	25 (69)	100	88	55	7	-	Joints mainly tight, two trends at 50° & 90°.		II	Red brown with grey green mottling, v. closely spaced fractures; mod. strong.			
CR							Sub-vert, well developed joint set. Lesser set at 50°.		II to III	Red brown and grey green; moderately weak to moderately strong; extremely closely spaced fractures.			
								0.66	II	Red-brown; moderately strong; rare fractures, tight, MnO coated.			
	19/6/83 26 (60)	100	85	50	15	-			II to III	Extremely closely spaced to v. closely spaced, open smooth fractures, dominantly subvertical.	32.00		
								0.85	II	Few discontinuities; mod. strong.			
							Sub-vertical & 50° joint sets. Open		II	V. closely spaced, open, smooth, MnO coated fractures.			
										Fractures closely spaced.			
								0.36	II				
	27 (63)	100	71	58	0	-					34.00		
CR								0.42	II	V. closely spaced to extr. closely spaced, open fractures.			
							Dominantly at 50-70°.			Grey-green and red brown fractures closely spaced tight calcite cemented; mod weak to mod strong.			
	28 (47)	100	96	86	34	-	Tight joints dominant 20-50°		II	Extremely closely spaced.			
											36.00		
	29 (52)	100	81	52	20	-	Recovered as gravel and clay. Sub-vertical joint		III IV	Extremely closely spaced, open fractures Closely spaced fractures, rare. Weak CLAYSTONE.			
								0.30		Banded, slightly weathered and moderately weathered; weak to mod strong; fractured horizons at 36.65 to 26.75m, 36.80 to 36.88m. 37.20 to 37.30m and 37.80 to 38.15m.			
								0.26	II to III				
	30 (63)	100	83	54	25	-	Open discontinuities, some clay-filled.						
CR							Two joint sets Sub-vert & 50°		II	Fractures v. close to closely spaced; mod. strong.	38.00		

KEY: SAMPLES:
U = Undisturbed.
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D = Disturbed.
P = Piston.
W = Water.

STANDARD PENETRATION TEST:
S = Hollow Shoe.
C = Cone Point.
R = Refer to text or explanatory data sheet.
( ) No. of blows to drive U sample.
f = fine. m = medium. c = coarse

REMARKS:

LOGGED BY: J. MILLSON

SCALE: 1:50

SHEET 4 OF 7

Contact BGS: ngdc@bgs.ac.uk

British Geological Survey

BGS ID: 377829 : BGS Reference: ST16NE37
British National Grid (27700) : 318680,168270

OSIRIS-CESCO LTD.

SITE INVESTIGATION DIVISION

ST 16 NE/37
BOREHOLE No: LBH1

Continuation Sheet No: 4

REPORT No: D83070

LOCATION: LAVERNOCK POINT

Sampling/Test Results	Run Number (Drill Time)	Circ. Return	Total Recovery	Solid Core Recovery	RQD	Fracture Frequency	Detail	Point Load Strength Is50 (MPa)	Weathering Grade	Description	Downhole Depth & Change of Strata (m)	Elevation m. O.D. (N)	Instrumentation/ Symbolic Log
	MINS	% 0 100	% 0 100	% 0 100	% 0 100	(/m) 0 10		MPa 0 10	I VI				
	31 (72)	100	71	56	46	-	Fractures open sub-vertical at 60°. Recovered as clay and gravel.	0.38 0.36	I	(As above) RED MARLS.			
	32 (50)	100	75	24	11	-	Dominant sub-vertical joint in less fractured zones.		II to III	Interlayered; slightly weathered MUDSTONE and ext. closely spaced, fractured moderately weathered CLAYSTONE (150-400mm thick), very thin calcite veins along bedding; m. weak to m. strong.	40.00		
CR	33 (41)	100	87	73	33	-	Fractured zones very clayey.			Extremely closely spaced fractured zones at 40.65 to 40.79m, 40.85 to 41.00m, 41.00 to 41.20, 41.26 to 41.50m 41.76 to 41.80m, 42.12 to 42.26m. - these intervals v. weak; moderately weathered.	42.00		
	20/6/83 34 (43)	100	52	19	0	-				42.50 to 43.50m extremely closely spaced fractures; moderately weathered.	43.25	-24.14	
	35 (52)	100	77	14	0	-				Red brown; fractures extremely closely to very closely spaced, open, smooth MnO coated, clay filled in part; MUDSTONE; very weak to weak. Occasional thin more competent horizons with sub-vertical joint set. (MERCIA MUDSTONE GROUP : RED MARLS).	44.00		
CR	36 (53)	100	76	0	0	-				Material recovery predominantly as clay with fine-medium gravel.			
	37 (35)	100	63	7	0	-			IV to III		46.00		
	38 (35)	100	63	0	0	-							
CR	39 (51)	100	66	0	0	-					48.00		

KEY: SAMPLES:
U = Undisturbed.
B = Bulk Disturbed.
D = Disturbed.
P = Piston.
W = Water.

STANDARD PENETRATION TEST:
S = Hollow Shoe.
C = Cone Point.
R = Refer to text or explanatory data sheet.
( ) No. of blows to drive U sample.
f = fine. m = medium. c = coarse

REMARKS:

LOGGED BY: J. MILLSON SCALE: 1:50 SHEET 5 OF 7

114

Contact BGS: ngdc@bgs.ac.uk

British Geological Survey

BGS ID: 377829 : BGS Reference: ST16NE37
British National Grid (27700) : 318680,168270

ST 16 NE/37

OSIRIS-CESCO LTD.

SITE INVESTIGATION DIVISION

BOREHOLE No: LBH1
Continuation Sheet No: 5
REPORT No: D83070

LOCATION: LAVERNOCK POINT

Sampling/Test Results	Run Number (Drill Time)	Circ. Return	Total Recovery	Solid Core Recovery	R.Q.D.	Fracture Frequency	Detail	Point Load Strength Is50 (MPa)	Weathering Grade	Description	Downhole Depth & Change of Strata (m)	Elevation m. O.D. (N.)	Instrumentation/ Symbolic Log
	MINS	% 0 100	% 0 100	% 0 100	% 0 100	(/m) 0 10		MPa 0 10	I VI				
	40 (49)	100	32	0	0	-			IV to III	(As above/RED MARLS)	50.00		
CR	41 (49)	100	90	25	0	-							
	21/6/83										51.30	-32.19	
	42 (68)	100	91	65	44	-	Fractures at 30-40o & 70o. Highly gypsiferous nodular band.	0.62	II	Red brown with thin grey-green horizons; generally closely spaced with some horizontal very closely spaced discontinuities; gypsiferous (nodular and vein satinspar) MUDSTONE; mod weak to mod. strong. (MERCIA MUDSTONE GROUP: RED MARLS). Gypsum veins occur throughout up to 15mm in width. Nodules <70mm, average 20-30mm. Discontinuities occur principally adjacent to nodules from where veins radiate. Particularly gypsiferous horizons at 52.05 to 52.35m and 52.75 to 53.00m.	62.00		
CR	43 (57)	100	96	90	69	-	Highly gypsiferous nodular band.						
	44 (49)	100	64	39	15	-	Recovered as gravel & clay	0.48	III II	V. closely spaced to extremely closely spaced; weak to moderately weak. Moderately weak; gypsiferous.	54.00		
	45 (53)	100	77	47	34	-	Recovered as gravel.	0.44	III II	Interlayered fractured and non-fractured; moderately weak; fractures open, v. closely spaced to mod. closely spaced. Red brown and grey-green; moderately weak.	56.00		
CR	46 (65)	100	81	67	37	-		0.64 0.54	III	Gypsiferous; discontinuities closely spaced tight gypsum cemented; mod. weak to mod. strong. Nodules <5 to 6cm. Gypsum rich horizons with radiating veins; 56.00 to 56.10m, 56.48 to 56.58m, 56.70 to 56.90m, 57.00 to 57.20m, 57.75 to 57.85m, 58.00 to 58.56m, and 58.68 to 58.76m.			
	47 (71)	100	84	81	62	-		0.51 0.30			58.00		

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R = Refer to text or explanatory data sheet.
( ) No. of blows to drive U sample.
f = fine. m = medium c = coarse

REMARKS:
Very broken rock resulted in core being dropped after completing runs and recovered during next

LOGGED BY: J. MILLSON SCALE: 1:50 SHEET 6 OF 7

f114

Contact BGS: ngdc@bgs.ac.uk

British Geological Survey

BGS ID: 377829 : BGS Reference: ST16NE37
British National Grid (27700) : 318680,168270

ST 16 NE/37

OSIRIS-CESCO LTD.

SITE INVESTIGATION DIVISION

BOREHOLE No: LBH1
Continuation Sheet No: 6
REPORT No: D83070

LOCATION: LAVERNOCK POINT

Sampling/Test Results	Run Number (Drill Time)	Circ. Return	Total Recovery %	Solid Core Recovery %	RQD %	Fracture Frequency (/m)	Detail	Point Load Strength Is50 (MPa)	Weathering Grade	Description	Downhole Depth & Change of Strata (m)	Elevation m. O.D. (N)	Instrumentation/ Symbolic Log
	MINS	0 100	0 100	0 100	0 100	0 10		MPa 0 10	1 VI				
CR	22/6/83							0.22 0.28	II	Mod weak, small gypsum nodules.			
	48 (60)	100	75	57	23	-	Recovered as gravel. Rec. as gravel.		III III	Fractures v. close to extremely closely spaced, tight to open, clayey in part. Fractures v. close to extremely closely spaced, tight to open, clayey in part.			
							Gypsum veins predominantly at 20-30°.	0.22 1.14	III	Red brown and grey green; very common gypsum nodules; weak to moderately strong.	59.95	-40.84	
							Rec. as gravel & clay.		III	Grey-green CLAYSTONE v. closely spaced to extremely closely spaced, open, smooth fractures.			
	49 (57)	100	83	64	50	-	Rec. as gravel.		II III	Grey-green CLAYSTONE; fractures very closely spaced to extremely closely spaced, open, smooth.			
CR									II		61.97	-42.86	
								0.31	III	Red-brown; very gypsiferous thin gypsum veinlets and v. common small gypsum nodules, fractured horizons of CLAY-STONE; discontinuities closely spaced to very closely spaced, tight gypsum cemented.			
	50 (68)	100	81	69	27	-	Rec. as gravel & clay. Rec. as gravel & clay. Recovered as gravel & clay. Gypsum veins dip 30-60° Veins in fractures.		II III II				
											64.25	-45.14	

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P = Piston.
W = Water.

STANDARD PENETRATION TEST:
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C = Cone Point.
R = Refer to text or explanatory data sheet.
( ) No. of blows to drive U sample.
f = fine. m = medium. c = coarse

REMARKS:

Borehole grouted with 1:1 cement/bentonite grout above and below piezometer installation. Hole collapsed on pulling PX casing preventing grouting between 30.00 and 20.00m. depth approx. Piezometer installed at 45.00m. depth.

LOGGED BY: J. MILLSON

SCALE: 1:50

SHEET 7 OF 7

T114

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NGRC

BOREHOLE RECORDS

ADJUSTMENT FORM

QUARTER SHEET ST16 NE.

BH REGISTRATION NUMBER 37 -38.

NUMBER NOT USED / ~~LOG MISSING~~

(Delete as appropriate)

Logs registerd as ST16NE 67-68.

British Geological Survey

BGS ID: 377795 : BGS Reference: ST16NE3
British National Grid (27700) : 317160,168880

ST17SE/3-13

SECTION OF _____ at Cardiff Western Sewer

COUNTY _____

Communicated by _____ Date of sinking _____

One-inch Map (N.S.) _____ Six-inch Map _____

HEIGHT ABOVE O.D. _____ DIP OF STRATA _____

	Thickness.			Depth from Surface.		
	Yards.	feet.	ins.	Yards.	feet.	ins.
ST 17 SE/9 1608. 7018						
No. 7 Borehole. Surface level 95·11 ft. (Glam. 47 S.W.E.)						
Soil			9			
Marl		5	–			
Strong marl		9	–			
Soft parting		1	3			
Strong marl		45	–			
		61	0			(18·59m.)
A little water at 37 ft. from surface.						
ST 16 NE/1 1627. 6990						
No. 8 Borehole. Surface level 46 ft. (Glam. 47 S.W.E.)						
Blue lias [coloured on plotted section as 'red marl' The sample is red marl.		16	0			(4·88m.)
Dry hole. "Bottom of this hole is close on to the red ground." [prob. this note should refer to Borehole No. 9]						
ST 16 NE/2 1662. 6949						
No. 9 Borehole. Surface level 44·64 ft. (Glam. 47 S.W.E.)						
Soil			6			
Red marl [coloured on plotted section as 'blue lias' The sample, labelled 'blue lias', is green marl.		14	6			
		15	0			(4·57m.)
A little water at 10 ft. from surface.						
ST 16 NE/3 1716. 6888						
No. 10 Borehole. Surface level 53·24 ft. (Glam. 47 S.W.E.)						
Soil		1	6			
Clay		3	–			
Clay & red marl		7	–			
White rock		15	6			
Red rock		1	–			
White rock		2	6			
[Samples all appear to be Tea-green marls]		30	6			(9·30m.)
A little water at 24 ft. from surface.						

(18,366). Wt.25,740—17. 2000. 12/09. A.&E.W.

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NGRC

BOREHOLE RECORDS

ADJUSTMENT FORM

QUARTER SHEET ST16NE.

BH REGISTRATION NUMBER 1-5.

~~**NUMBER NOT USED**~~ / **! LOG MISSING !**

(Delete as appropriate)

Logs filed with ST17SE 3-13.

British Geological Survey

BGS ID: 377818 : BGS Reference: ST16NE26
British National Grid (27700) : 317420,167780

Monk

Site Investigation

BOREHOLE RECORD

ST16NE/26
1742 6778

BOREHOLE No. 5

CLIENT: County of South Glamorgan

SITE: St Mary's Well Bay to Swanbridge Road Improvement

Sheet 1 of 1

Job Ref. SI.1600/11

Daily Progress	Water Level	Samples in situ tests and coring runs: Depth From	Depth To	Type	N Value or Core Recov.	Depth	Description of Strata	Reduced Level	Legend
							Ground Level m.A.O.D.	31.26	
20.6.78						0.20	TOPSOIL	31.06	
							Sandy CLAY		
(1.50)		1.20	1.75		82%	1.20		30.06	
21.6.78		1.75	2.25		80%		Light yellow-brown occasionally mottled grey silty CLAY with frequent angular and rare rounded limestone shale and mudstone gravel		
		2.25	2.65		100%		(Reworked mudstone and shale)		
		2.65	3.90		36% (0%)	3.50		27.76	
	▽ (1.50)	3.90	4.40		40% (0%)		Completely weathered becoming less weathered with depth light yellow-brown becoming dark grey mottled with orange very weak often clayey or friable SHALE with bands of moderately weak to moderately strong siltstone at about 4m		
		4.40	5.30		56% (0%)				
(1.50)						5.30	END	25.96	

Type and Diameter of Boring:-

Rotary H size using air flush

Logged by:- GHJ

Scale:- 1 : 50

Remarks:-
Descriptions GL - 1.2m based on driller's observations
Groundwater struck at 3.7m and rose to 1m after 15 mins

Contact BGS: ngdc@bgs.ac.uk

British Geological Survey

BGS ID: 377818 : BGS Reference: ST16NE26
British National Grid (27700) : 317420,167780

IGS 1334 (1148) 5000 3/75

Institute of Geological Sciences

RECORD OF SHAFT OR BOREHOLE

6-in or 1:10 000 Map Registration No.

ST16NE/ 26

National Grid Reference

1742 6778

1-in or 1:50 000 New Series Map No.

263

Enter 'C' if Confidential

Name and Number of Shaft or Borehole:

St Marys Well Bay BH 5

For whom made SOUTH GLAMORGAN COUNTY COUNCIL

Town or Village CARDIFF *County* GLAMORGAN

Exact site (reference to a fixed point on 1-in or 1:50 000 Map)

Purpose for which made Site Investigation

Ground level at shaft bore relative to O.D. _____ *m. If not ground level give O.D. of beginning of shaft bore* _____ *m.*

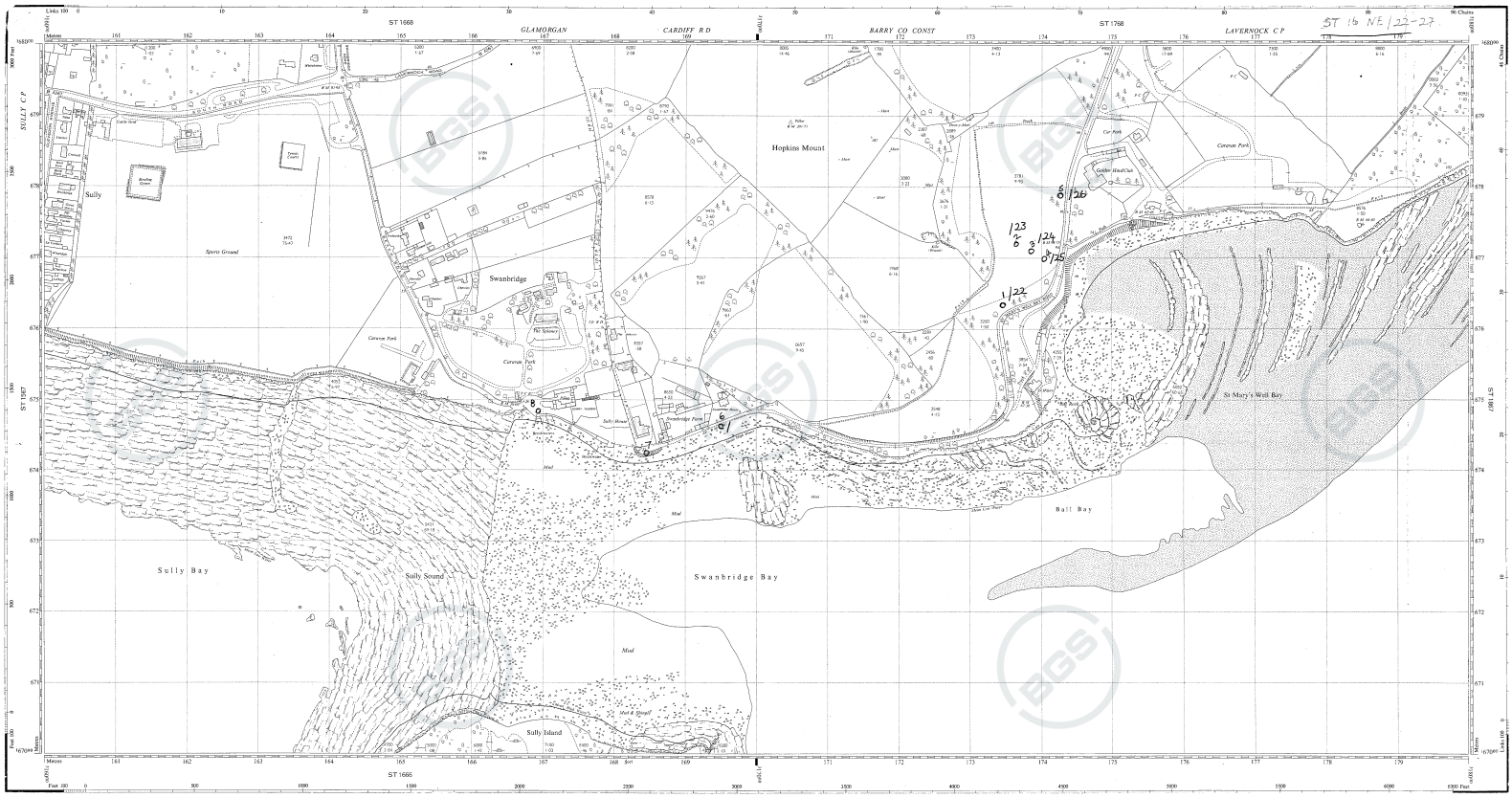
Made by A Monk & Co. Ltd *Date of sinking* 1978

Information from Examination of core *Examined by* DJD Lawrence

Specimen Numbers and Additional Notes

Geological Classification	Description of Strata	Thickness metres	Depth metres
TRIASSIC PENARTH GROUP WESTBURY FORMATION. (top of hole possibly just into Lilstock formation).	Dark grey clay, no core.	1.20	1.20
	Mudstone, pale grey-green, calcareous, fragments in greenish brown clay. Fragment of very pale grey, very-fine-grained limestone in top 0.3m (Fragment of white lias, Langport, limestone).	1.65	2.85
	Mudstone, dark grey to black, fissile, rusty weathering, 15mm bed of fibrous calcite, "beef", at 3.75. Limestone medium grey, from 4.04 to 4.06. Core very broken for most of length.	1.47	4.32
	Limestone, medium grey, fine-grained, broken.	0.04	4.36
	Mudstone, black, as fragments is very broken core.	0.64	5.00
	BASE OF BOREHOLE		

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ST 16 NE 22-27
ST 1668
ST 1768
ST 1666
GLAMORGAN
CARDIFF R D
BARRY CO CONST
LAVERNOCK C P
SULLY C P
Hopkins Mount
Sully
Swanbridge
Caravan Park
Sports Ground
Golden Hind Club
St Mary's Well Bay
Bull Bay
Sully Bay
Sully Sound
Swanbridge Bay
Mud
Sand & Gravel
Sully Island
126
123
124
125
122