

SA1 Tesco Redevelopment – Preliminary Study for a Full Site Investigation – Feasibility Stage

*FUNDAMENTALS OF CONSTRUCTION TECHNOLOGY
(ACBA4022)
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Summary

The aim of a Phase 1 Land Contamination Assessment or Preliminary Risk Assessment is to determine the historical uses of the proposed site, as well as any nearby or adjacent land, and to identify possible sources of contamination. It is crucial to assess all past uses of the site and surrounding areas, as pollutants may spread from the original source, depending on the local geology, groundwater, and surface water conditions. Alternatively, the results may help to eliminate the need for further investigation at an early stage.

The Desk Study builds a picture of a site, reviewing site specific data including geology, history, hydrogeology, hydrology, environmental data sets and other information relevant to the site. By identifying potential contamination sources, pathways and receptors, a picture can be built to establish if pollutant linkages may be present. (Wormseye, nd)



(Google Images)

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Introduction

The City and County of Swansea have chosen to enter into a joint agreement with Jarvis Hotels to create a new five storey hotel, bar, restaurant and conference centre on the site of the Tesco superstore and car park, located on Oystermouth Road by opposite Swansea Marina. (See figure 1)

The current site (Tesco Superstore and Carpark) will be demolished and cleared prior to works beginning and will relocate to the old Debenhams building within the Quadrant shopping centre and use the Debenhams car park as its customer facility.



Figure 1: Google Maps

The purpose of this report is to provide an overview of the site and any potential underlying risks which may affect the proposed scheme progressing. The results will provide us with the idea if a more intrusive site investigation is needed and highlight the most critical site-specific elements that pose the highest risk.

The report will adhere to the principal aims of BS10175:2011 with regard to the investigation and development of potentially, and proven, contaminated land.

The desktop study uses historical/archival information, as well as codes of practice and building regulations to provide the information required, prior to the contractor or site developer undertaking a physical investigation.

Methods and Materials

Within this report you will find historical and technical data from online data bases, libraries and archival sources available, which were used to conduct this investigation.

Site History

Prior to Tesco's building a £13.5 million new super store in 2000, the land was owned by a gas company who constructed their gas works. Production at the site dates back to 1841 when Swansea Gas Light Company began making gas by burning coal. Once the production of gas stopped in 1922, the facility was used for gas distribution up until 1949. (*WalesOnline*, 20/05/2020)



Figure 2: Gas holders alongside Oystermouth Road (1989) (WalesOnline, 20th May 2020)

Due to the improvement of energy production in the mid 20th century, the demand for gas within Swansea town had reduced, causing the closure of the gasworks. Tesco's then purchased the land in April 1999 and spent £1.3 million clearing the site and the store opened its doors February 2000.



Figure 3 Oystermouth road in 1975 looking towards where Tesco is. WalesOnline (07/03/2017)

Flooding

As you can see on the image below, it is shown that the site is considered to be at little or no risk of fluvial or coastal/tidal flooding. (Geocortex Viewer flood map, 10/01/2025)

The development site sits outside of flooding constraints and is currently positioned towards the rear end of an existing parking infrastructure. There is already an established access point to the site which will be used to access this development.

The site is well located, close to existing travel networking such as bus services and a train station and situation within the city centre of Swansea and near 5 minute walk from Swansea Bay.

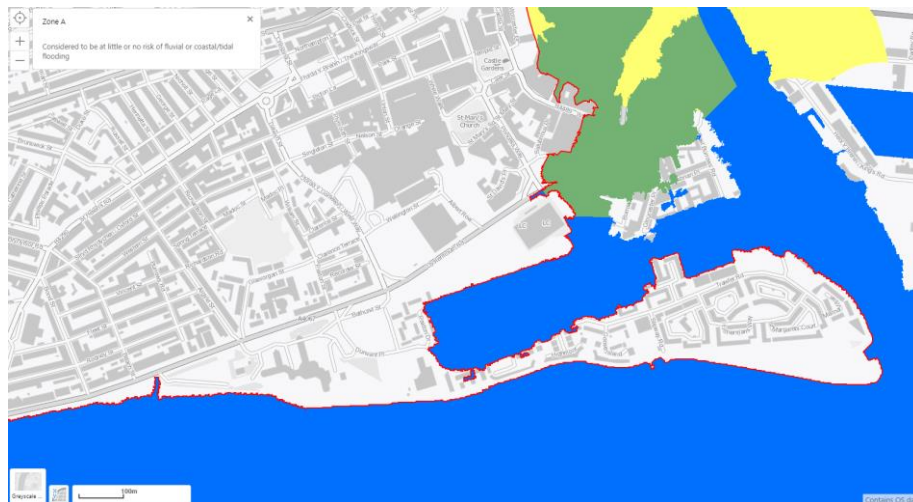


Figure 4: Geocortex Viewer flood maps

Utilities

Water - There is existing water supply infrastructure in the vicinity, and which can be connected into. Further dialogue will be required with DC/WW.

Electricity - There is Electrical supply infrastructure in the vicinity of the site, which can be connected into. Further dialogue will be required with the Utility company.

Ecology

As the site is currently occupied, both as a store and a carpark, there is no real concern regarding ecology but there is hedgerows and trees present. I would believe during the construction of the super market ecology would have been a concern and something that would have been discussed and reviewed. With that being said, the super market was built over 20 years ago and ecology is now a huge priority in construction and new schemes. I would advise an up to date preliminary ecology report is undertaken, prior to works beginning on site.

This is to ensure compliance is met, under the Wildlife and Countryside Act 1981. The Wildlife and Countryside Act 1981 is a legislation in the UK to protect wildlife and natural habitats. (Legislation. Gov.uk, nd)

Historical Background

Swansea holds a lot of history and grew rapidly due to its coal trade, which was booming in the Industrial Revolution, becoming one of the worlds largest coaling ports in the world. The export of coal also contributed to the development of nearby industries, such as copper smelting, further boosting Swansea's economy.

Today, Swansea Marina and its surrounding areas stand as a symbol of the city's transformation. While coal played a pivotal role in the growth and development of the region, its decline marked the beginning of a new era for Swansea as a city of culture, tourism, and modern development.

The legacy of the coal trade in Swansea is still celebrated, with references to the city's industrial past found in historical sites, museums, and local landmarks.

The Ordnance survey below dating back to 1949, illustrates the construction of industrial buildings in and around Swansea marina.

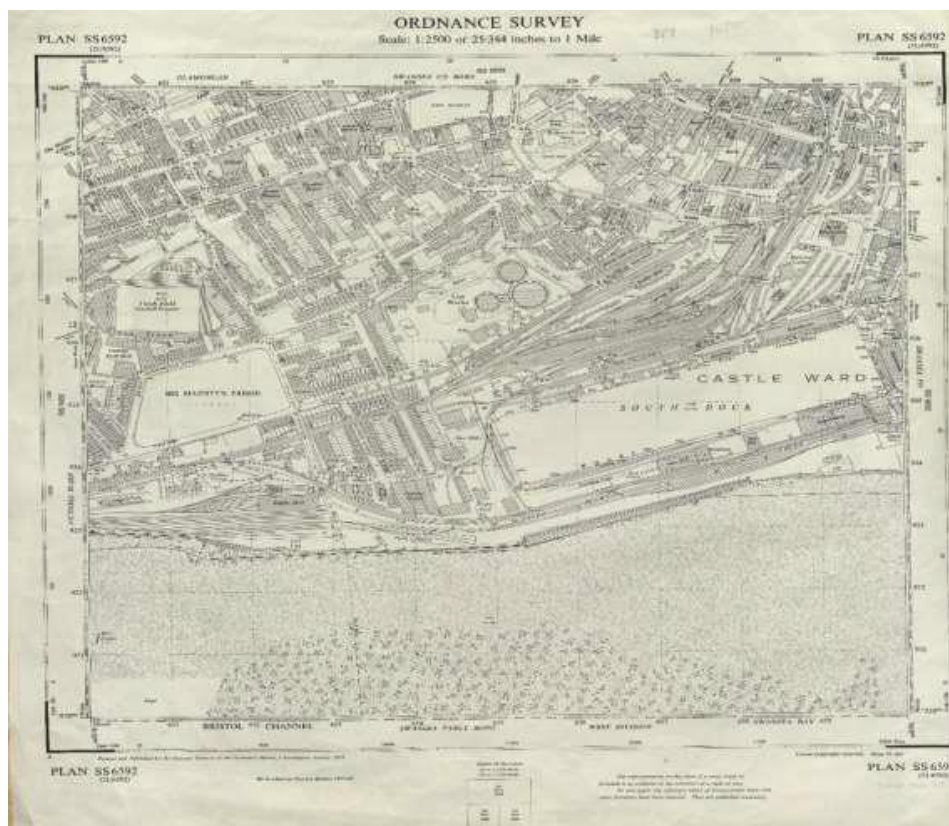


Figure 5: Swansea Archives - Ordnance Map before redevelopment dated 1949

Unexploded Ordnance

When the Germans invaded the UK in the second world war, Swansea was targeted for its ports and railways. Its reports Swansea was hit with around 1500 bombs (BBC News, 2018)



It is said that the percentage of bombs which were dispersed over the UK in World War 2 that did not explode is 10%. The Ministry of Defence were involved in making safe roughly 450 German World War 2 bombs, meaning there is a potential risk on site of unexploded ordnance on site, especially with potential deep excavations.

I would recommend a further investigation for unexploded ordnance hazards is undertaken, prior to any works beginning on site.

Historic Ordnance Survey Maps of Swansea

Below are four ordnance survey maps of Swansea from 1897-1947.



Figure 7: Historic Ordnance Map from 1897

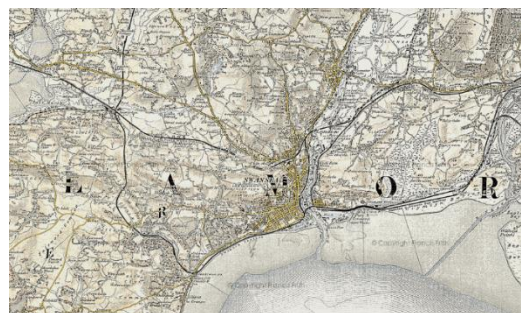


Figure 6: Historic Ordnance map from 1900-1901



Figure 9: Historic Ordnance map from 1923



Figure 8: Historic Ordnance map from 1947

Proposed Site

The site is located in the city centre of Swansea, an ample location for a new five storey hotel. With a 5 minute walk to the marina and beach and situated in the city centre, it offers several compelling reasons for both tourist and locals to stay. Here re some of the key benefits:

- Appeal to different types of guests
 - Tourists
 - Event goers
 - Business Travellers
- Location
 - 5 minute walk from the marina
 - 5 minute walk from the beach
 - City centre amenities
- Scenic View and Relaxation
- Boost in Tourism
- Seasonal and year round appeal
- Local Transportation and Connectivity
- Leisure centre near
- Swansea arena – host of event and concerts

In conclusion, a hotel in a city-center location just a short walk from the marina and beach is ideally situated to attract a diverse range of guests, from leisure travelers to business professionals, thanks to its proximity to both natural beauty and urban amenities. This makes it a highly desirable and profitable location for a hotel.

Borehole logs

Once Tesco's purchased the land, prior to construction starting, borehole drilling was completed to take samples of the grounds below for geological and environmental purposes. This is done to gather information about the composition, structure and properties of the subsurface. This information is extremely important when it comes to the foundation design, ground water assessment, contamination and other geotechnical and environmental investigations. (*GEO Integrity, 05/01/2024*)

As you can see below 5 boreholes were conducted beneath the main structure and one at the rear of the carpark. (To see Borehole logs 1-6 please refer to Appendix 1,2,3,4,5 and 6)



Figure 10: BGS (Location of boreholes, nd)

Having reviewed the borehole logs, it's noted they were conducted in between January - June 1999. The logs all show very similar results, down to roughly 0.3/ 0.4 meters indicates the ground is made up of solid materials such as stones, tiles and rubber film. Further down, from 0.4 meters to roughly the 4 meter mark, the ground is compiled if various types of clay. Numerous fields such as hydrogeology, environmental science, and geotechnical engineering gain significant insights from detecting clay in borehole logs.

Furthermore, recognising clay in borehole logs gives critical information for hydrogeological modelling, environmental conservation, engineering design, and geological assessment, allowing for more informed decision-making and effective project implementation.

During the course of the investigation, one of the logs indicated the presence of brown peat, which is easily identified by its fibrous texture and rich brown colour. Brown peat differs from other peat types in these characteristics. Peat forms when organic material or partially decomposed vegetation accumulates, typically in wetland areas like bogs, fens, and moors. This process occurs in waterlogged conditions with low oxygen levels, which slows the decomposition of plant matter. If not properly accounted for in foundation design, the high compressibility and low shear strength of peat can lead to substantial settlement problems. The high moisture content in peat can also complicate construction by creating instability and making excavation more difficult. Building on peat often requires specialized foundation methods or soil stabilization techniques to prevent structural issues.

In 2 borehole logs, rom the 0.3m mark to roughly 2.5m, the material taken from the log was described as dark brown moulted clay. This would suggest that the clay has been soaked with water and is highly dense. When wet clay is found in a drilling record, it has extensive implications for geotechnical engineering and construction.

Recommendations Wet clay has low shear strength, which can lead to instability in slopes and foundations. Its presence indicates the possibility of significant movement under load, which may compromise structural integrity.

Recommendation

From the information gathered from this investigation, I would recommend using a pile foundation. The information received from the borehole logs, presenting hardcore materials, clay and brown peat, a piling foundation offers multiple benefits. As seen in the borehole logs soft clay is present, this could be defect the surface making it to weak or compressible, a pile foundation can transfer the load of the building to a deeper, more stable soil or rock layer offering more stability.

Pile foundations are ample for multi-storey building as they are designed and engineered to withhold substantial loads, both horizontal and vertical, they not only hold the load of the building but also the other live loads, for example, furniture, people staying within the hotel and equipment. As you can imagine a 5 storey hotel is a heavy structure. A pile foundation can support the load of the building, transferring and evening the weight to more solid layers of rock, which are deeper in the ground, ensuring the structure is stable.

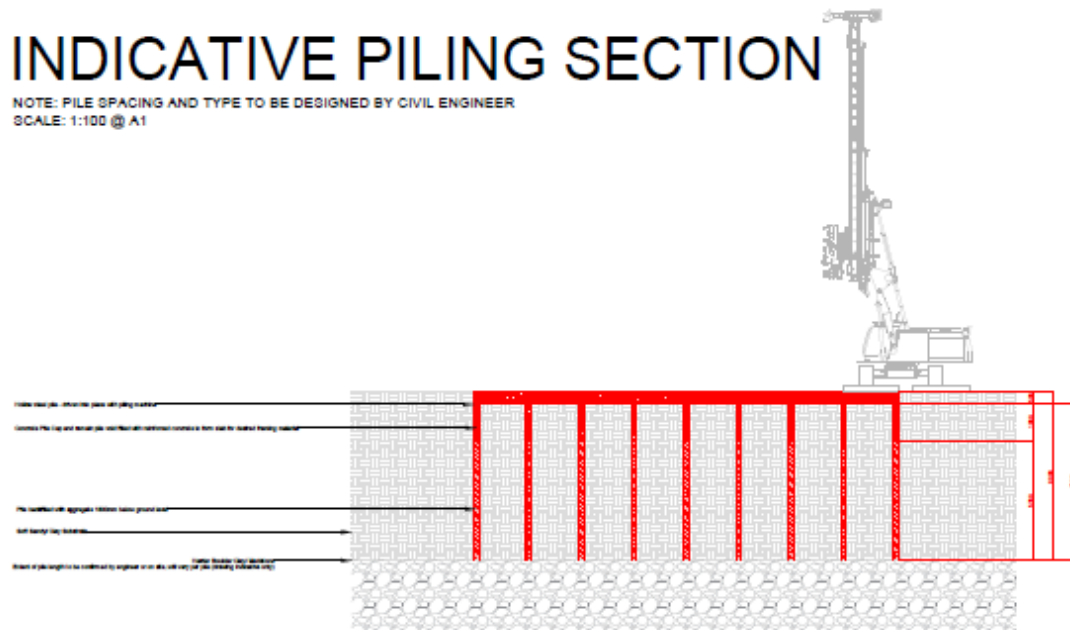
Due to the hotel being constructed in a busy and built up area, a pile foundation is a more efficient option as they requires less surface space. Pile foundations are driven deep into the ground, causing minimal disturbance to surrounding areas. (Pile Foundations in engineering by Robert W. Day, nd)

Conclusion

In conclusion, pile foundations provide increased durability, stability, and load-bearing capability for a multi-story hotel building, especially in areas where deeper support is required due to structural constraints or soil conditions. By choosing a pile foundation, the hotel's structure is guaranteed to be safe, strong, and resilient over time against environmental factors and load-related stresses. This choice guarantees adherence to engineering best practices and building standards in addition to safeguarding the investment.

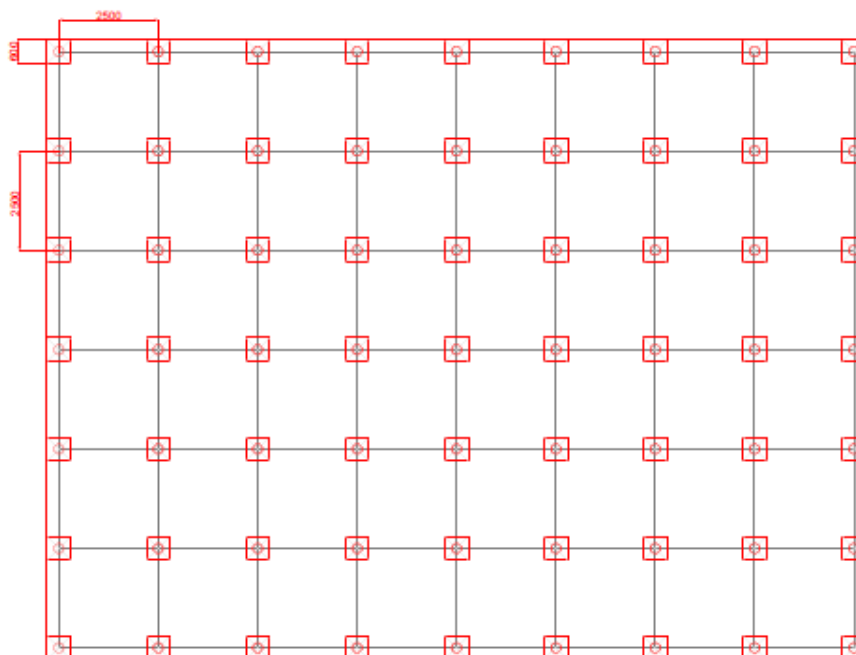
INDICATIVE PILING SECTION

NOTE: PILE SPACING AND TYPE TO BE DESIGNED BY CIVIL ENGINEER
SCALE: 1:100 @ A1



INDICATIVE PILING PLAN

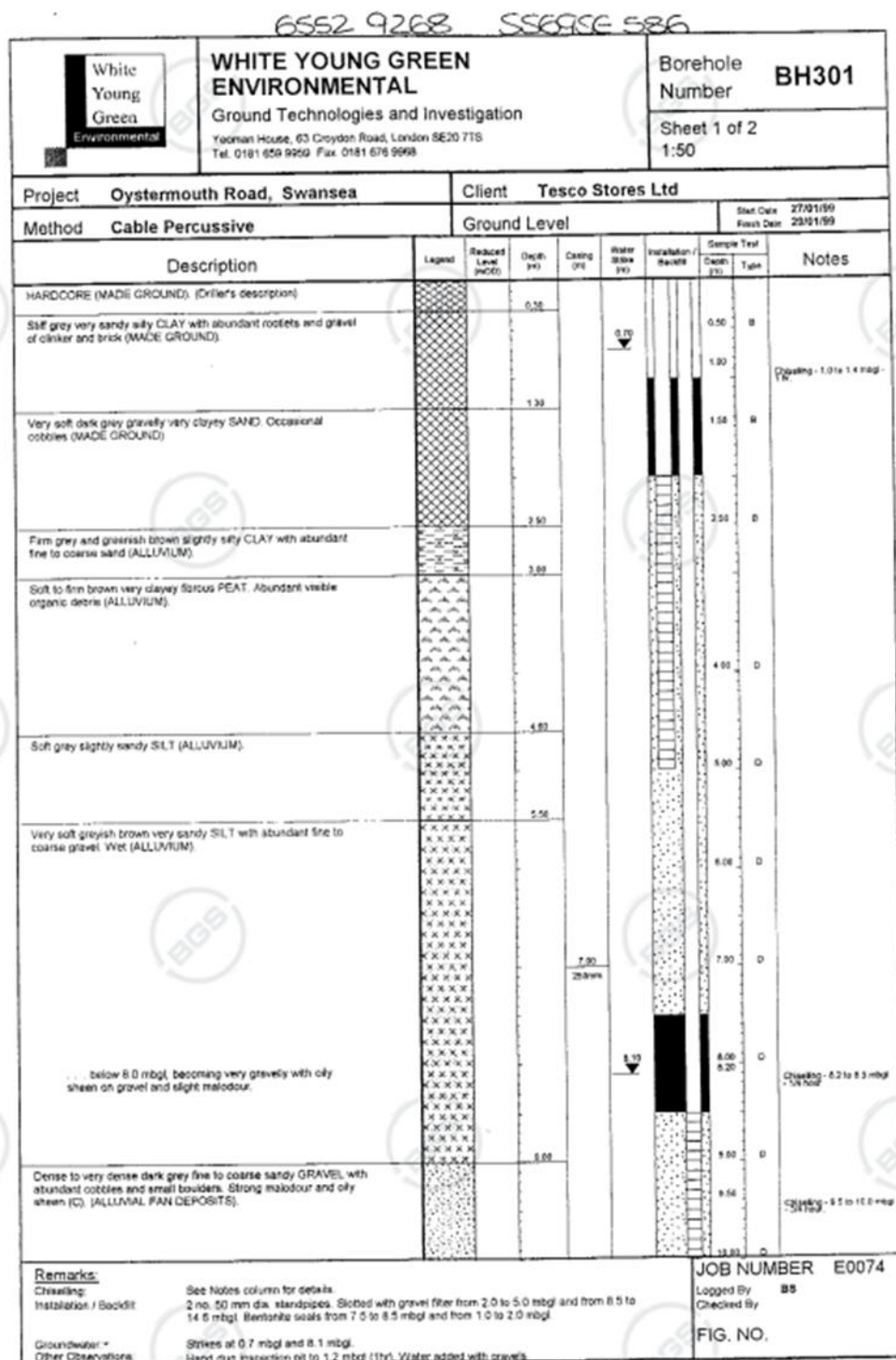
NOTE: PILE SPACING AND TYPE TO BE DESIGNED BY CIVIL ENGINEER
SCALE: 1:50 @ A1



Appendix 1 – Borehole Log 1

12

Appendix 2 – Borehole Log 2



Appendix 3 – Borehole Log 3

6551 9263 5569SE 587

		WHITE YOUNG GREEN ENVIRONMENTAL Ground Technologies and Investigation Yeoman House, 63 Croydon Road, London SE20 7TS Tel: 0181 659 9959 Fax: 0181 676 9908				Borehole Number BH302 Sheet 1 of 1 1:50		
Project Oystermouth Road, Swansea			Client Tesco Stores Ltd			Start Date 27/01/99 Finish Date 27/01/99		
Method Cable Percussive			Ground Level					
Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water (Box) (m)	Installation / Records	Sample Test Depth (m) Type	Notes
HARDCORE (MADE GROUND) (Driller's description):			0.30					
Dark brown and beige mottled clayey SAND with abundant gravel, brick fragments and occasional cobble (MADE GROUND).							0.50 B	
... below 1.0 mbgl, becoming dark grey and very gravelly.					1.50		1.50 B	Chiselling - 1.5 to 2.0 mbgl - SW
			2.00				2.50 B	
Dark brown GRAVEL and SAND with occasional cobble and shell fragments (MADE GROUND).							3.50 D	
Soft brown greyish green sandy SILT with much organic debris and rootlets (ALLUVIUM).			4.00				4.00 D	
Spongy brown fibrous PEAT (ALLUVIUM).							5.00 D	
... at 5.0 mbgl, becoming slightly clayey.							6.00 D	
			7.00	7.00			7.00 D	
Soft to firm greenish grey SILT with occasional organic debris (ALLUVIUM).				200mm	7.20		8.00 D	
... below 7.5 mbgl, becoming silty and grey.			8.00					
Borehole completed at 8.00mbgl								
Remarks: Chiselling: Installation / Backfill: Groundwater: Other Observations:						See Notes column for details. 50 mm dia. HDPE standpipe installed. Slotted with gravel filter from 4.0 to 8.0 mbgl. Bentonite seal from 3.0 to 4.0 mbgl. Backfilled with screenings from G.L. to 3.0 mbgl. Cover and gas tap fitted. Seepages at 1.5 mbgl and 7.3 mbgl. Hand aug inspection pit to 1.2 m (34 ft).		
						JOB NUMBER E0074 Logged By BS Checked By FIG. NO.		

Appendix 4 – Borehole Log 4

6554 9264 SS67SE 538

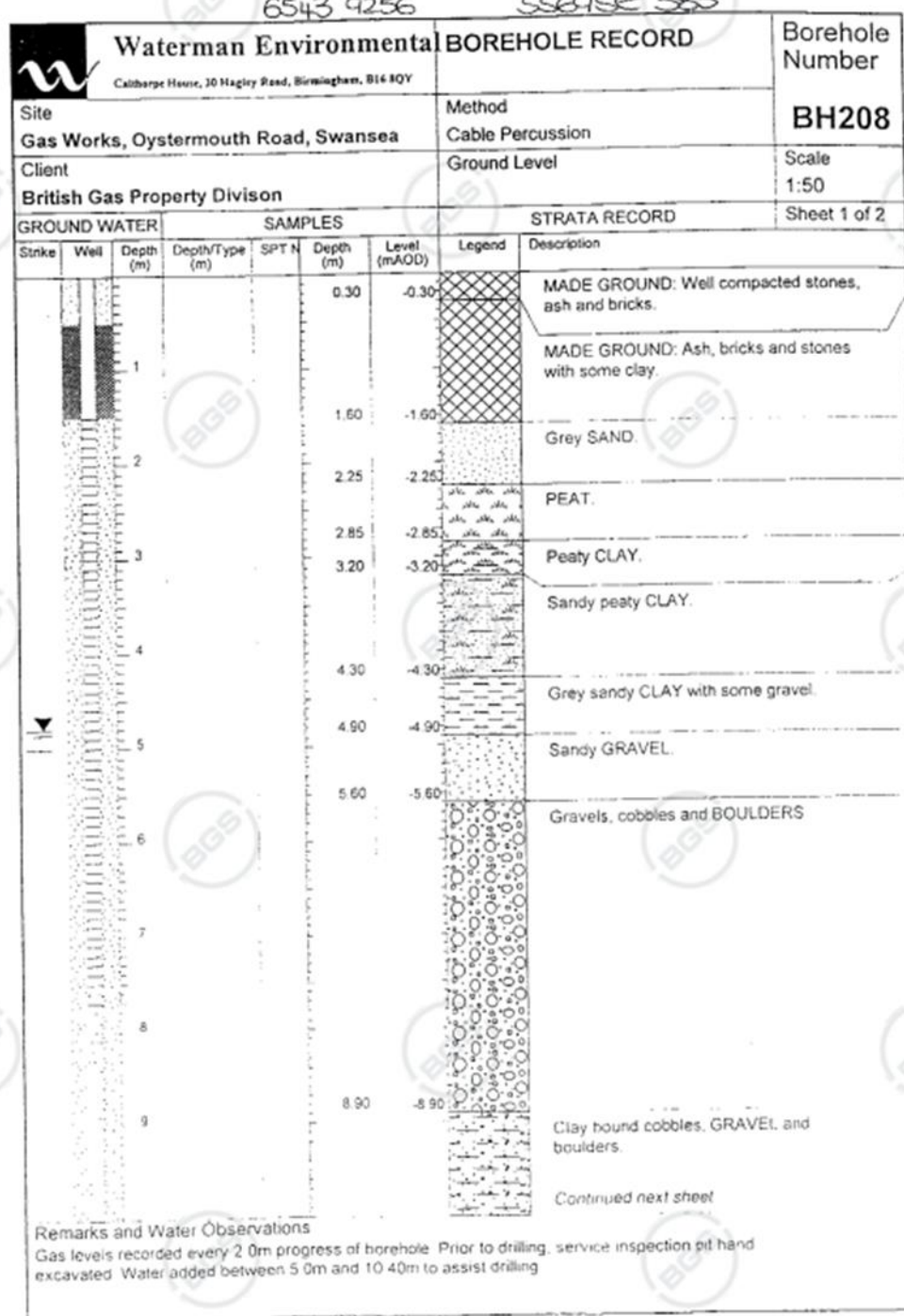
	WHITE YOUNG GREEN ENVIRONMENTAL Ground Technologies and Investigation Yeoman House, 63 Croydon Road, London SE20 7TS Tel: 0208 659 9509 Fax: 0208 676 9608					Borehole Number BH501 Sheet 1 of 2 1:50		
	Project Oystermouth Rd, Swansea					Client Britannia Construction Ltd		
Method Pilcon 150					Ground Level			
					Start Date 10/05/99 Finish Date 14/05/99			
Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Street (m)	Installation / Backfill	Sample Test	Notes
Hardcore, flint, rubble fill (MADE GROUND)			0.40				6.50 D	
Grey black green mottled silty CLAY							1.00 D	
							3.00 D	
Yellow brown mottled silty CLAY with large rounded cobbles			3.80				3.80 D	
Cobbly GRAVEL with grey coarse sand			4.20				4.20 D	
							5.00 D	
			6.50				7.60 D	
Cobbly GRAVEL							8.80 D	
							9.70 D	
Remarks: Chiselling from 6.3 to 6.6mgl for 1½ hours, 7.2 to 7.6mgl for ½ hour 50mm diameter HDPE standpipe installed to 10mgl. Slotted pipe from 4.5-10.0mgl with gravel filter surround. Bentonite seals at 0-1.0mgl and 3.3-4.3mgl Groundwater: No groundwater encountered Other Observations: Water added from 4.2-6.6mgl, 7.2-14.7mgl and 14.7-19.5mgl. Logs based on driller's description						JOB NUMBER E0074/14 Logged By Driller Checked By FIG. NO.		

Appendix 5 - Borehole Log 5

6553 9267 SS69NE 589

 WHITE YOUNG GREEN ENVIRONMENTAL Ground Technologies and Investigation Yeoman House, 63 Croydon Road, London SE20 7TS Tel: 0203 659 9959 Fax: 0203 676 9958		Borehole Number BH502 Sheet 1 of 1 1:50						
Project Oystermouth Rd, Swansea		Client Britannia Construction Ltd						
Method Pilcon 150		Ground Level						
		Start Date 15/05/99 Finish Date 15/05/99						
Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Sample (m)	Installation / Backfill	Sample Test	Notes
Hardcore (MADE GROUND)			0.40					
Red brick, concrete and black ash fill (MADE GROUND)			1.80					
Wood concrete and rubble fill (MADE GROUND)			3.00					
Soft grey silty ALLUVIUM			4.30					
Brown PEAT			5.20					
Soft grey ALLUVIUM			5.90					
Grey ALLUVIUM with embedded rounded gravel			7.10					
Large rounded COBBLES			8.60					
GRAVEL, with coarse grey sand			8.70					
Borehole completed at 10.00mOD			10.00					
Remarks: Chiselling from 5.4-8.7mOD for 1/2 hr 50mm diameter HDPE standpipe installed to 10.0mOD. Skirted pipe from 7.0-10.0mOD with gravel filter surround. Bentonite seal from 6.0-7.0mOD. Fitted with gas valve and flush fitting cover. Groundwater: No groundwater encountered. Other Observations: Water added from 7.1-10.0mOD. Log based on drillers description.		JOB NUMBER E0074/14 Logged By Checked By FIG. NO.						

Appendix 6 - Borehole Log 6



Referencing

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