

SITE INVESTIGATION CASE STUDY; A REPORT

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Executive Summary

A preliminary study for a full site investigation on behalf of the City and County Swansea and Marriott Hotel to construct a restaurant and ice-cream parlour with a manager's apartment on Swansea's foreshore. The building is to contain the restaurant, café bar, ice-cream parlour, kitchen and food storage on the first floor and a self-contained manager's apartment to the second. This all within approximately 300 square meters. The preliminary investigation will include archival information found on the relevant site and surrounding area as well as current archaeology and notes to any additional investigations that may be required.

Principle Focus

The focus of this report is to establish the possibility of construction on a specified site in SA1, Swansea. The report will consider aspects from the sites historical background and current surroundings to conclude an appropriate site evaluation. This site investigation will help identify which foundation will be best suited for a low-rise building.

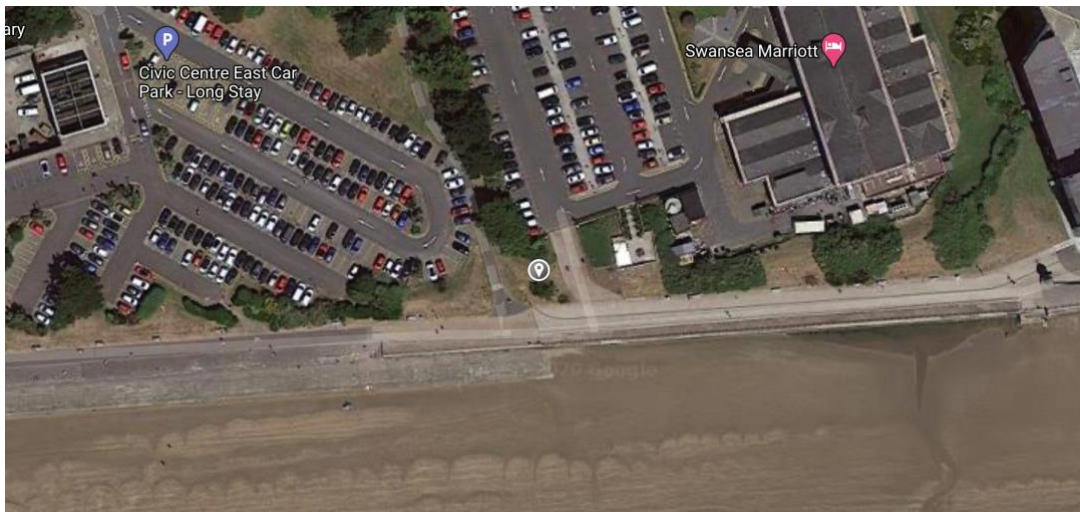
Investigation

Desktop study

The site is located between the current County Hall and the Marriot Hotel in SA1, Swansea. Approximately 0.5m from Maritime Quarter and Swansea City Centre and approximately 4 miles from Mumbles Pier. The site currently consists of a pathway leading to the shore and is adjacent to the car parks situated for County Hall and the Marriott Hotel. The immediate surroundings are of vegetation and further afield the area becomes more built up. Current access would be via foot on the pathways and via vehicle to the nearing car parks. Access from the desktop study does not look sufficient for construction vehicles and facilities. The site is approximately 0.9 acres and is directly based on the foreshore of Swansea.

Intrusive investigation

Following a visit to the site it is apparent that there is enough space for the erection of a low-rise building at this location as there is no indication of immediate substructural issues and there are no overhead obstructions. The site is very close to the shore and with only a section of the coastal path being extended in front of this site location it would restrict the total length of the project as the completed building will need to be protected as much as possible from the rise of the sea level. The coastal path has been constructed at height that does not exceed the typical rise and fall of the sea level which creates a lower risk level for the constructed dwelling. Oystermouth is not acknowledged as a high-risk area according to a flood risk report carried out by City and County of Swansea in 2015 (City and County of Swansea, 2015).



(Google, 2020)

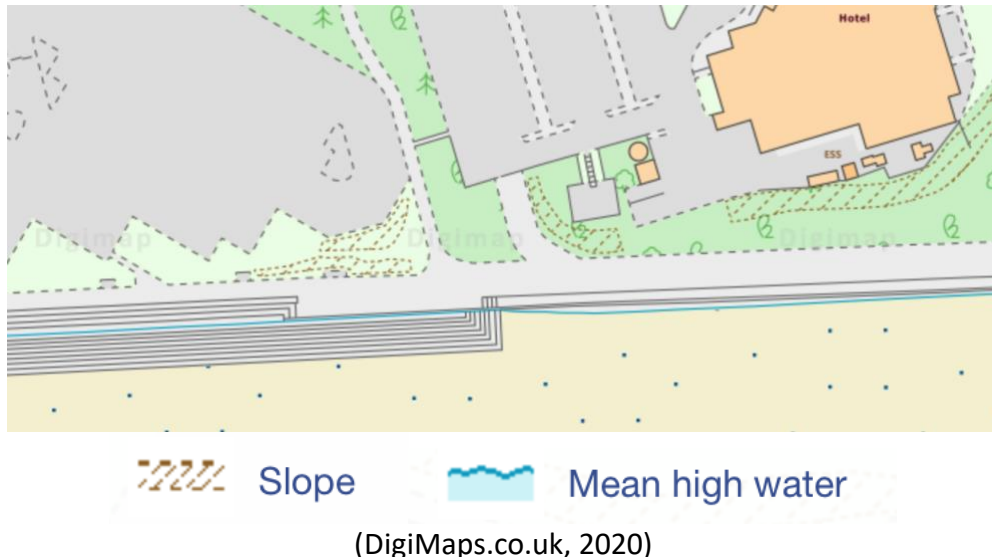
Archival

On February 19th, 1941 Swansea was hit by the first day of the 'Blitz' which reportedly saw around 800 high explosive bombs hit the city centre and resulted in 230 deaths. As a large acting dock during WW2 Swansea was targeted and heavily hit during the three-night horror. This subsequently led to Swansea having to re-build its city from scratch, with most of the town reduced to rubble. It is reported that over 11,000 homes and buildings were either completely destroyed or damaged during the Blitz. Swansea did not start to see large improvements following the war until the investment and developments in the late 1970's which saw the beginning of the Maritime Quarter and various other 'big name' buildings such as the County Hall and the Marriott Hotel which opened a decade later (Dulin, 2016).

Topography

The site location is slightly sloped and may have been structured this way to prevent groundwater levels raising above the ground level and causing damage to the nearest buildings. In this case, if the sea water level was to rise above the barrier the ground would absorb a percentage of the water and prevent any flood or damage to the car parks or buildings. The ground does appear to be a range of infilled and landscaped which may be from the previous construction sites of both the County Hall and the Marriott Hotel

(DigiMaps.co.uk, 2020). As the site is located near Swansea' shore it is important to note the potential risk of high groundwater level caused by high tide. The coastal path currently passing through the front of the site location will help reduce this risk prior to construction. However, it is important to consider the water levels changing due to the possibility of high tides and what impact this will have on the foundations.



South Wales bedrock is predominantly mudstone, siltstone and sandstone which is apparent for this particular site location. It is also noted that the superficial geology of the potential site is dominated by blown sand (BGS, 2020). With construction having been carried out previously for both the County Hall and the Marriott Hotel it is possible to assess previously carried out borehole logs such as the borehole log carried out for the proposed County Hall ref: SS69SE345 at (BGS, 2020) by West Glamorgan County Council. The information found on this open hole borehole log confirms the bedrock for the location to be "boulder clay" and "grey mudstone". This borehole log supports our evidence that the likelihood of the bedrock at the proposed site is to be coarse at around 22m in depth. This would indicate that the foundation would be best to be laid at this depth where the soils will be able to bear the load of the proposed superstructure.

Mine working

Due to the location of the site being within close proximity of the shore it is unlikely direct mining happened here. With heavy excavation work previously been carried out within the surrounding areas since the 1980's and multiple developments having already occurred, at a much larger scale than the proposed it is unlikely this would be a large risk for the construction of a low-rise building in this exact location.

Contamination

Pre-war the site appears to have been used as a heavy duty railway which would have been responsible of transfers of industrial materials such as contaminating substances which may have spilled or leaked out over the years and led to a change in the rocks and soils permeability on the direct site (DigiMaps.co.uk, 2020). There is no immediate

indication of contamination to the surrounding ground that would cause an issues during construction phase. However, it would be recommended to carry out a further, more in depth investigation using the appropriate machinery to conclude the possibility of contamination on site in accordance with BS 10175, BS 8576 and industry guidance (BSI Group, 2020).

Vegetation

The surrounding vegetation is notably from its natural environment with little interference from external influences. To the left of the potential site (East) it is full of natural surroundings such as scrubs. To the left (West) of the site there is a more mixed landscape, potentially from the original construction work of the County Hall and car park.



Existing services

There are currently existing services leading to both the County Hall and The Marriott Hotel however upon site investigation there is no indication of any underground services or access points on the exact site and there are no overhead services preventing construction.

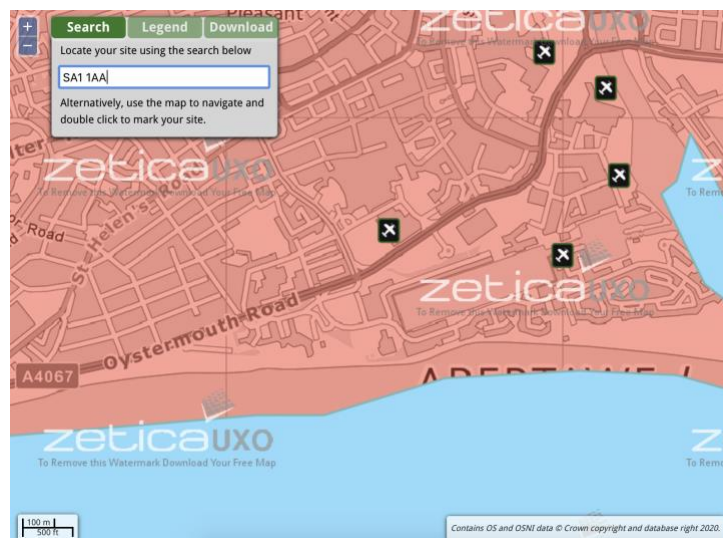
Access

Current access for the site is via pathways and vehicle entries only. This is a narrow and more complex access as it does not currently allow room for larger construction vehicles. However, the surrounding area for the site such as the car parks are mostly level

and obstruction free to allow room for larger machinery as well as possible facilities required on site. This would require permission from both the local authority and the Marriott Hotel who are the clients for this development and would most likely not object. During construction traffic measures will need to be taken into account as the road leading to the site, Paxton Road, is a heavily trafficked road by the residents of the Maritime Quarter as well as currently being the only form of access for the public and employees of both the County Hall and Marriott Hotel. In this particular instance I would suggest operation the parking facilities for both companies out of the council car park behind the site with permission for Swansea's local authority, Swansea City Council. This should then prevent any damage or risk to vehicles or pedestrians during construction and will also allow more facilities on site for construction staff. This would also allow more area to be used during the construction period for machinery and deliveries on site.

Buried Munitions

The Swansea docklands were severely hit during World War 2 and the ground and whole of Swansea changed a lot of its geography due to this. This could suggest that there are buried munitions within the vicinity of the site location that may cause large risk to construction employee's and the surrounding residential area. In other parts of the UK, found UXO's have led to thousands of occupants having to vacate areas to allow for the UXO's to be safely detonated (Zetica UXO, 2020). From further investigation to this particular site location it is not likely to be any buried munition that may cause risk.



(Zetica UXO, 2020)

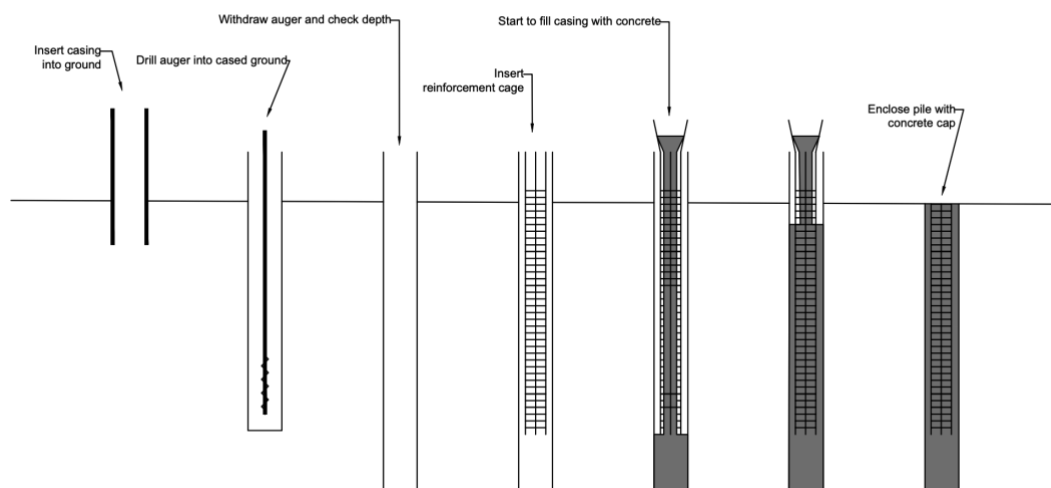
Surrounding archaeology

The majority of the surrounding area is levelled car parks and a smaller sectioned off viewpoint from the Marriott Hotel. There are no large, high-rise buildings in the immediate vicinity that would cause an effect of construction in this location. Both the County Hall, built 1982 and the Marriott Hotel, built 1989 (Travel Weekly, 2020) were part of the re-development of the Maritime Quarter in the 1980's as mentioned under 'archival'. As the site was previously a large railway backdating to the 1920's and it appears from current

recourses such as (DigiMaps.co.uk, 2020) that majority of the ground in this location is infilled it is possible that below the immediate ground material there could be historic archaeology such as steel tracks which would subsequently have an effect on the foundation and whether it would incur further cost to remove any existing archaeology to allow for deeper foundations.

Suitable Foundation

Using the found information as well as pre-existing research carried out within the surround vicinity it would suggest that a deep pile foundation method would be best suited for the proposed low-rise dwelling at this location. This is due to the findings of the topography and surround archaeology. Using a deep pile foundation method in this location will allow for the sufficient load of the dwelling to be laid at a low enough depth to support the weight but also best suited to not have any detrimental effects on the existing buildings nearby. As settlement is always anticipated on new construction sites it is important to consider that the likelihood and the effects of the settlement on this particular project will be higher due to its close proximity to water levels. With a deeper pile foundation this should allow for that settlement to happen without causing damage or permanent effects to the completed dwelling. Based on the preliminary observations using a deep foundation and bored piles would best suit the project. The use of bored piles will allow for the piles to be cast in situ which will not be as disruptive to the surrounding buildings compared to using driven piles which require to be driven, jacked, vibrated or screwed into the ground. The installation of the bored piles must comply with BS EN 1997-1:2014+A1:2013, Section 7, and Clause 4 and Clause 6 as stated on (BSI Standards Limited 2020, 2015).



Sketch of bored pile cast in situ.

Conclusion

It is feasible to commence a full site investigation of this location for the proposed dwelling. The site currently does not give any indication of substructural issues that may prevent the construction of a low-rise dwelling. I would recommend further investigation into the weathering of the potential dwelling over time due to the location being directly on the shorefront and with high levels of blown sand in the area what damage this could cause over the decades and what possible work or prevention can be put in place. Following the preliminary investigation and the information on the geology from previously carried out bore logs it would be recommended to use a deep piled foundation using bored piles.

References

- BGS, 2020. *Borehole Scan Viewer*. [Online]
Available at: http://scans.bgs.ac.uk/sobi_scans/boreholes/370246/images/10677924.html
[Accessed 11 November 2020].
- BGS, 2020. *Geology of Britain viewer (classic)*. [Online]
Available at:
http://mapapps.bgs.ac.uk/geologyofbritain/home.html?&_ga=2.134368305.1301892881.1605099751-825223999.1605099751
[Accessed 11 November 2020].
- BSI Group, 2020. *BSI Group*. [Online]
Available at:
https://shop.bsigroup.com/ProductDetail/?pid=000000000030362551&_ga=2.57519982.552029311.1605098156-655189572.1605098156&_gac=1.189951577.1605098182.CjwKCAiAtK79BRAIEiwA4OskBv3MlaQQczTtGx6HbhSOYVKvx09siEI2YE4k73idSeOiPxr9iYHDRoCI7oQAvD_BwE
[Accessed 11 November 2020].
- BSI Standards Limited 2020, 2015. *Code of Practice for foundations*. [Online]
Available at: <https://www-ihsti-com.ezproxy.uwtsd.ac.uk/tempimg/1BD092F-CIS888614800328849.pdf>
[Accessed 11 November 2020].
- City and County of Swansea, 2015. *Flood Risk Management Plan 2015*, Swansea: City and County of Swansea.
- DigiMaps.co.uk, 2020. *OS Roam*. [Online]
Available at: <https://digimap.edina.ac.uk/roam/map/os>
[Accessed 6 November 2020].
- Dulin, D., 2016. *Swansea still regenerating 75 years after Blitz*. [Online]
Available at: <https://www.bbc.co.uk/news/uk-wales-south-west-wales-35494885>
[Accessed 11 November 2020].

Google, 2020. *Google Maps*. [Online]

Available at: <https://www.google.co.uk/maps/@51.6141998,-3.944827,533m/data=!3m1!1e3>

[Accessed 6 November 2020].

Swansea City and County Council, 2020. *War, Blitz, Victory and Reconstruction*. [Online]

Available at: <https://www.swansea.gov.uk/article/57572/War-Blitz-Victory-and-Reconstruction>

[Accessed 11 November 2020].

Travel Weekly, 2020. *Swansea Marriott Hotel*. [Online]

Available at: <https://www.travelweekly.com/Hotels/Swansea-Wales/Swansea-Marriott-Hotel-p55150724>

[Accessed 9 November 2020].

Welsh Government, 2011. *National Strategy for Flood and Coastal Erosion Risk Management in Wales*, s.l.: Crown.

Zetica UXO, 2020. *Risk Map*. [Online]

Available at: <https://zeticauxo.com/downloads-and-resources/risk-maps/>

[Accessed 11 November 2020].