

Llewellyn Road, Penllergaer

Introduction

The proposed development located in the Penllergaer area of Swansea, is irregular in shape and located to the west of Coedwig Hywel Farm. The site centres on an approximate National Grid Reference of 261010 199090, occupying a plan area of approximately 5.93 Hectares. Site boundaries are defined by hedge rows/trees.

The site comprises two large agricultural fields which are used to graze cattle. The land descends to the west. Houses are located south of the site, Ceodwig Hywel Farm located immediately east of the site. Further fields are located north of the site and a mast located to the northeast of the site.

The site elevation is approximately 80m AOD sloping down to approximately 57m AOD to the South West.

Ground Conditions

The ground conditions were encountered to be predominantly granular with variable cobbles and boulders with a high silt/clay content. Top soil was confirmed as being typically 200mm deep, again with high clay content. The eastern end of the site is situated on a former opencast mine, with the made ground predominately made of sandy gravelly silt/clay. A summary of the ground conditions can be found below.

Depth (m)	Thickness (m)	Stratum
Eastern Site (Former Opencast Area)		
0.00 - 7.30/7.50	7.30/7.50	MADE GROUND: Very soft sandy gravelly SILT/CLAY over variable sandy gravelly SILT/CLAY with cobbles to boulders to clayey sandy GRAVEL to BOULDERS.
7.30/7.50 - >8.20	-	MUDSTONE
East of Grovesend Fault (Outside Opencast Area)		
0.00 - 3.20/8.50	3.20/8.50	Soft, becoming firm to stiff, variably sandy gravelly SILT/CLAY with cobbles and boulders.
3.20/8.50 - >30.00	-	MUDSTONE AND SANDSTONE (Coal absent except thin coal (0.2m) in RP14).
West of Grovesend Fault		
0.00 - 6.50/10.50	6.50/10.50	Soft, becoming firm to stiff, variably sandy gravelly SILT/CLAY with cobbles and boulders.
3.20/8.50 - >30.00	-	MUDSTONE AND SANDSTONE and two COAL SEAMS

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Based upon the encountered ground conditions and a site walk over, it is evident that rainfall typically runs over the surface towards the south and western boundaries rather than permeate the surface.

Greenfield Run Off Rate.

The discharge rate has been determined by the use of ReFH2 data.

ReFH2 Qmed - 77L/S

Qbar - $77 \times 1.08 = 83.16\text{L/s}$

Based upon the size of the development (5.9Ha), we have determined the site has a greenfield run off rate of 14.09L/S/Ha. The site has two distinct catchment areas, and the discharge rate within each catchment has been determined by the proposed impermeable area only. Calculations can be seen below.

TOTAL AREA CATCHMENT A = 2.36Ha

CATCHMENT A IMPERMEABLE ARE = 1.62Ha

TOTAL AREA CATCHMENT B = 3.54Ha

CATCHMENT B IMPERMEABLE ARE = 1.63Ha

FLOW PER HECTARE $83.16/5.9 = 14.09\text{s/Ha}$

CATCHMENT A - $1.62\text{Ha} \times 14.09 = 22.80\text{L/S}$

CATCHMENT B - $1.63\text{Ha} \times 14.09 = 23.00\text{L/S}$

Consideration for SUDS

The preferred method for surface water disposal in the SuDS train is via infiltration methods such as soakaways, infiltration basins and swales, however, the ground conditions on site prevent this due to the high clay content. Where this isn't possible, open features such as swales utilised as conveyance channels and small event storage should be used where practicable. Due to the steep nature of the site, conveyance channels are not suitable. To

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allow sufficient treatment of the surface water, a combination of Pervious Paving and Bio-retention/Rain Gardens with an underdrain will be utilised. Due to the location of the ditches along the site boundaries, we are able to discharge the surface water at a restricted rate to 'a nearby watercourse'. Attenuation will be via an open basin within each catchment, with one basin being located to the south west of the site, and the second positioned to the south in

proximity to the site access.

Proposed Drainage

Surface Water

The proposed drainage system consists of a series of pervious paving, bioretention/rain garden systems and attenuation basins before discharging to the nearby ditches at the above mentioned QBAR rates. Flows from each catchment will be catered for by its own attenuation basin allowing for two separate outfalls. The flows for both catchments will be controlled by a flow control devices such as a Hydrobrake. Where water flows exceed the permitted discharge, water will back up into an attenuation basin, capable of storing all events including the 1:100 year event with an allowance for 30% climate change. An allowance for 10% Urban Creep has been provided within the systems.

Please refer to drawings 10289 – 101 - 01/ 02 – Drainage Layout for further information.

The surface water proposals will be subject to the approval of the SABs.

Foul Water

The site Foul flows are to be drained via a gravity system that is intended to be offered to Dwr Cymru Welsh Water (DCWW) under a S104 application. The final point of connection will fall under a requisition to which DCWW has been instructed. The discharge of the foul water is subject to Surface Water removal under the remit of the Memorandum of Understanding (MoU) for which the investigations are underway.

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