

EDENSTONE HOMES
PROPOSED RESIDENTIAL DEVELOPMENT
COWBRIDGE ROAD, ST ATHAN



FLOOD & DRAINAGE STATEMENT
SEPTEMBER 2016
16156.D101A

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1.0 INTRODUCTION

Shear Design Ltd has been instructed to prepare a flood & drainage strategy in respect of a proposed residential development off Cowbridge Road, St Athan. This report has been prepared on behalf of Edenstone Homes and is intended to support an outline planning application for the residential development.

The proposed development comprises of the construction of circa 300 residential dwellings with associated access, parking areas and enabling infrastructure. The site is allocated for housing in the deposit LDP.

The purpose of this report is to describe the existing site and associated drainage infrastructure and to identify a sustainable solution for the proposed surface and foul water drainage.

The National Grid Reference is ST 01226 69466. A site location plan is included in [Appendix A](#).

The site is not in a tidal flood zone, however there is a small section of the site in the north west corner that is identified by Natural Resources Wales as being within flood zone 3. This is a small area and not likely to have any significant impacts on the development potential of this land.

This report also provides a preliminary assessment of flooding from all other sources.

This document has been prepared following consultation with Dwr Cymru Welsh Water and Natural Resources Wales.

Shear Design Limited has prepared this report in accordance with the instructions of their client, Edenstone Homes, for their sole and specific use.

2.0 SITE DESCRIPTION & TOPOGRAPHY

Site Description

The development site is situated off Cowbridge Road, St Athan, Wales.

The site is bounded by Cowbridge Road to the west and by residential properties to the south. Along the north boundary lies the Nant-y-Stepsau a designated main river. The site for the main part has no formalised vehicular access however a portion of the land to the south east can be access via Flemingston Road. All other areas of the site have existing gated access and the land is currently being used for agricultural purposes.

The total site area is approximately 10.9 hectares (Ha) and following development approximately 5.6 Ha is likely to be impermeable area.

The existing site currently comprises of agricultural fields, a Dwr Cymru Welsh Water owned pumping station and an access track/hardstanding area to the south east.

Site Topography

The site survey shows a maximum level difference of 14.3m (34.1m to 48.4m AOD) falling east to west across the fields in the direction of the Nant-y-Stepsau river.

There are three parcels of land which make up the overall site. The two largest areas are greenfield separated by a hedgerow. The smaller section of land to the south east contains a large number of trees and existing hardstanding. There is a step of between 1-2m between the smaller section of land and the two fields.

The topographic survey is reproduced in [Appendix B](#).

3.0 EXISTING DRAINAGE AND SITE INVESTIGATIONS

Site Investigation and Site History

There was no ground investigation available at the time of completing this report however the 1:50000 scale BGS geology map suggests the site is underlain by interbedded limestone and mudstone. Borehole scan data also available on the BGS website supports this with borehole logs showing predominantly limestone with clay banding.

The potential for surface water infiltration into the ground has not been explored at time of writing this preliminary report.

Based on local knowledge permeability is expected to be low and variable across the area.

Existing Foul and Surface Water drainage

The Dwr Cymru/Welsh Water sewer record included in [Appendix D](#) indicates that there are no foul or surface water sewers located on site. There is a pumping station located to the south east which serves the established residential development.

To the west of the site, within the highway there is a rising main which discharges into a gravity connection MH ref: ST1694001.

The Nant-y-Stepsau river is located along the north west boundary and due to the site topography greenfield run off from our site would naturally enter this system.

4.0 FLOOD RISK

TAN 15 Development Advice Map in [Appendix C](#) indicates that the site substantially lies within Zone A (NRW zone 1), and is considered to be at little or no risk of fluvial or coastal/tidal flooding.

There is a strip of land along the Nant-y-Stepsau river to the north west that lies within Zone C2 and is considered to be a medium/high risk of flooding.

We have also reviewed the risks of flooding from other sources below:

Flood Source	Presence	Notes
Fluvial (River)	✓	River Nant-y-Stepsau to the North West.
Tidal (Sea)	X	None present.
Canals	X	None present.
Groundwater	X	Not anticipated due to topography and established lower lying development in close proximity to the site but will be investigated further by Site Investigation.
Sewers	X	No sewers recorded on site.
Reservoirs	X	None present.
Pluvial	X	Due to topography of the site there is very little risk of run off from adjacent land impacting on the development. Developed hard standing associated with adjacent land is lower than the development site with agricultural land higher to the east. NRW surface water flood mapping identifies small areas of surface water along the route of the water course. See below.
Development Drainage	✓	Proposed surface water drainage will be positively drained from the site to the lowest area of the site and flows will be restricted prior to discharge into the Nant-y-Stepsau river. Attenuation storage will be provided at this low point of the site, which is sized to prevent flooding from all events up to the 1:100 year plus 30% for climate change storm.

Fluvial

The Nant y Stepsau river runs from west to east along the north west boundary of the site.

The mapping available from the NRW and Welsh Government TAN 15 suggests that there may be local flooding caused by the river is restricted to a small strip along the river.

All residential development on site will be outside of this area.

Pluvial

NRW surface water flood mapping below shows an area of surface water flooding is restricted to the river flood area. Risk of flooding from surface water is considered to be low.



Source: Natural Resources Wales online flood data

Development Drainage

This will be described further in the next section however the surface water discharge from the development will be designed to cater for all storm events up to the 1 in 100 years plus 30% climate change event and off site flows limited to green field run off rates.

5.0 PROPOSED DRAINAGE STRATEGY

Foul Drainage

Network

The Dwr Cymru/Welsh Water sewer records indicate that there are no available gravity sewers in the vicinity of the lower end of the site.

DCWW have accepted a connection to their network at MH ST1694001 which is identified on the DCWW drainage records in [Appendix D](#).

A gravity connection to this manhole will not be possible from all areas of the site therefore it is proposed that foul flows from the site will need to be pumped to the point of connection.

Surface Water Drainage

Within Part H of the Building Regulations there is a hierarchy of discharge options to deal with surface water drainage. These are:

- i) Soakaways
- ii) Discharge to watercourse
- iii) Connection to public sewer

At the time of writing this report soakaway test information was not available. It is possible that there is some scope for limited infiltration on the site however local investigations on nearby sites suggest that ground conditions have variable and generally poor characteristics with regard to permeability.

Current proposals are to discharge surface water runoff into the Nant y Stepsau river via flow control set at green field run off rates; on site attenuation will be required.

The scope for discharging run off into the water course has been discussed at a meeting with Natural Resources Wales on 12th September 2016. NRW have advised that they will not be taking responsibility for agreeing the discharge rate into the river and that it will now be the responsibility of the council's land drainage officer however NRW will still be providing comment on the proposals as a whole, particularly as part of the site is within a flood zone. NRW did confirm that a discharge at green field run off rates is in line with their expectations.

In a previous outline planning application in 2009 for a development close to our site the Environment Agency had advised the following on discharge rates into the Boverton Brook catchment and Nant y Stepsau river. Refer to [Appendix G](#).

“The maximum Greenfield run-off rate for any discharges into the Boverton Brook catchment is 3.9 litres/second/hectare, and 7.4 litres/second/hectare for the Nant y Stepsau”

We have carried out our own calculations based on conservative soil value of 0.3 and calculated a green field run off rate of 5.6l/s/Ha for the 1:100 year event. A conservative discharge rate of 5l/s/Ha is proposed into the Nant Y Stepsau.

In accordance with planning policy we are proposing to design the on-site drainage such that run off for all storm events up to the 1:100 year + 30% climate change event is retained on site. A summary of the calculations can be found in [Appendix E](#).

The discharge rate of 5l/s/Ha has also been discussed with the Vale of Glamorgan council has attenuation options.

The currently preferred option, is an open storage lagoon to accommodate all surface water storage up to the 1:100 year + 30% climate change event. This would be maintainable by the local authority or suitable management company and could for part of the public open space if designed carefully as well as providing some ecological benefits.

It is estimated at this preliminary stage that an attenuation volume of 3200m³ would be required.

The attenuation system would be located at the lower end of the development to the north west, plans for both options can be found within [Appendix F](#).

6.0 SUMMARY

The site can be considered to be at low risk of flooding from all sources provided adequate drainage measures are designed for the site.

Foul water drainage for the 300 properties can be connected into the DCWW system at MH Ref ST1694001 south of the development into which foul flows from the site will be pumped.

Surface water drainage will be restricted to 5 l/s/Ha and discharge into the Nant y Stepsau river and storage can be provided in a number of ways. Provisionally an open lagoon is preferred by the development team and local authority.

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