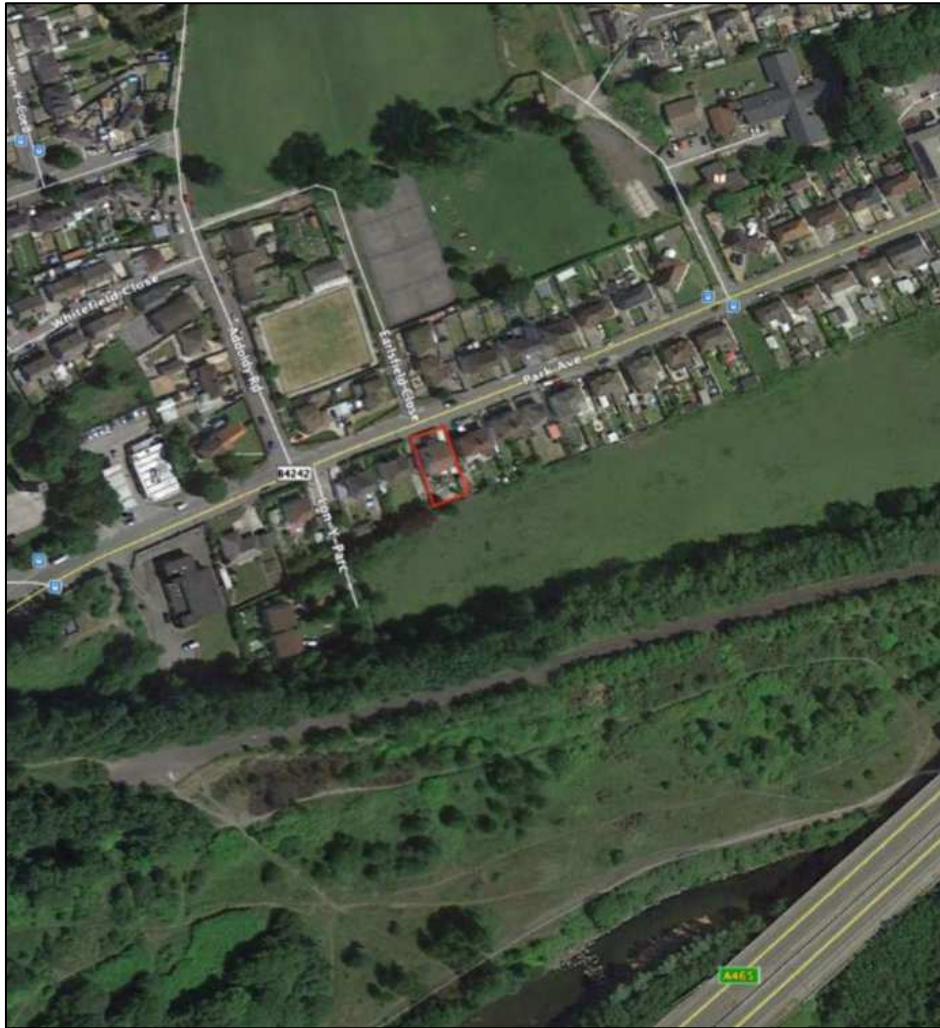




FCA for a Replacement Dwelling at 48 Park Avenue, Glyn Neath, SA11 5DR Contract Ref: K0983

Paul and Janice Hutchins

Hydro-Logic
Services 

part of

Hydro
International 

hydro-int.com

Contents

QUALITY ASSURANCE RECORD.....	4
Contributors for Hydro-Logic Services:	4
Document Status and Revision History:.....	4
Limitation of liability and use.....	4
EXECUTIVE SUMMARY	5
1. INTRODUCTION	6
1.1 Background (A1.2)	6
1.2 Sources of Information and Consultation (A1.1).....	6
1.3 Structure of this Report	6
2. SPATIAL PLANNING CONSIDERATIONS	7
2.1 The Site	7
2.2 Topography	8
2.3 Soils and Geology	9
2.4 Catchment Data	12
2.5 Natural Resources Wales Flood Zone	12
2.6 Justification Test	15
3. FLOOD HAZARD FOR EXISTING SITE	19
3.1 Source of Flood Risk.....	19
3.2 Flood Mechanisms	20
4. ASSESSMENT OF FLOOD RISK FOR PROPOSED DEVELOPMENT	23
4.1 The Development Proposals.....	23
4.2 Flood Risk Management Measures to Protect the Site (A1.5, A1.6, A1.7, A1.8, A1.11).....	23
4.3 Management of Flood Consequences elsewhere in the Floodplain (A1.9)	26
4.4 Residual Risks.....	26
4.5 Climate Change Impacts.....	26
4.6 Qualifications of those undertaking Flood Consequence Assessment (A1.10).....	27
5. SUMMARY AND CONCLUSIONS	28
6. REFERENCES	29
Appendix A: TAN 15 Requirements	30
Figure 1: Location of the Development Site (Source: Bing Maps and Blandford Consulting)	7
Figure 2: Google Satellite of the Site	8
Figure 3: Topography of the Development Site Source: Blandford Consulting	9
Figure 4: Soil Map of the Site and Surrounding Area	10
Figure 5: Superficial Deposits Underlying the Site and Surrounding Area	11
Figure 6: Bedrock Underlying the Site and Surrounding Area.....	11
Figure 7: Catchment Boundary (FEH Web Service)	12
Figure 8: TAN15 Development Advice Map (Natural Resources Wales) (Red dot at site)	13
Figure 9: NRW Flood Risk from Rivers and Areas Benefitting from Flood Defences (Natural Resources Wales) (Red dot at site)	13
Figure 10: NRW Model Output 1:1000yr Flood Depth for Defended Scenario.....	14
Figure 11: NRW Model Output 1:100yr Flood Depth for Defended Scenario.....	14
Figure 12: NRW Model Output 1:100yr Flood Level for Defended Scenario.....	16

Figure 13: NRW Model Output 1:1000yr Flood Level for Defended Scenario.....	16
Figure 14: NRW Model Output 1:100+20% CC Flood Level for Defended Scenario	17
Figure 15: Natural Resources Wales' Surface Water Flood Risk Map (building marked in red)	19
Figure 16: Natural Resources Wales' Flood Risk from Reservoirs (building marked in red)	20
Figure 17: NRW Model Output Defended 1:30yr Flood Velocity	21
Figure 18: NRW Model Output 1:100yr Flood Velocity	21
Figure 19: NRW Model Output 1:1000yr Flood Velocity	22
Figure 20: Existing and Proposed Site Layout (source Blandford Consulting).....	23
Figure 21: Determination of flood hazard (1:1000 year hazard (ringed in red) Source: Defra/EA 2008	25
Figure 22: NRW Model Output 1:1000yr Flood Hazard.....	25
Table 1: Grid reference details for the site (www.streetmap.co.uk).....	7
Table 2: Flood Risk Vulnerability and flood zone compatibility (TAN15 Pg.5).....	18
Table 3 Possible sources of flood risk	19
Table 4 Impermeable area of development	23

QUALITY ASSURANCE RECORD

Contributors for Hydro-Logic Services:

Name	Role
Alan Corner	Project Director
Alison Clare-Dalglish	Project Manager
Dr Yiwen Zhao	Principal Analyst & Reporter

Document Status and Revision History:

Version	Date	Author	Reviewer	Authoriser	Status / Comment
0	24/03/2021	YZ	ACD	A Corner	First Issue

Limitation of liability and use

The work described in this report was undertaken for the party or parties stated; for the purpose or purposes stated; to the time and budget constraints stated. No liability is accepted for use by other parties or for other purposes, or unreasonably beyond the terms and parameters of its commission and its delivery to normal professional standards.

EXECUTIVE SUMMARY

This report documents work undertaken by Hydro-Logic Services (International) Ltd. for Blandford Consulting between February to March 2021 and is a Flood Consequence Assessment for a replacement dwelling at 48 Park Avenue, Glyn Neath, SA11 5DR. The purpose of the work was:

- To assess flood risk at this site in terms of TAN15 and, where necessary, to recommend measures to achieve compliance.
- Produce a Flood Consequence Assessment (FCA) for the proposed development to satisfy the requirements of TAN15.

The key outcomes of the work are:

- The proposed development is within Zone C1 at risk of fluvial flooding but served by significant infrastructure including flood defences according to the current NRW map and therefore at low risk of fluvial flooding. The development is at “low” to “very low” risk of flooding from all other sources.
- Finished floor levels have been proposed for the development to ensure the building remains flood free for flood events up to and including the 0.1% AEP flood.
- Although there is no dry site access and egress for 1%AEP or above, the flood hazard is zero.

The work delivered the following outputs:

- This report.
- Estimated 0.1 % flood depths on the site based on the site topographical survey.

1. INTRODUCTION

1.1 Background (A1.2)

Hydro-Logic Services (International) Ltd. (HLS) has been appointed by Blandford Consulting to undertake a Flood Consequence Assessment for a replacement dwelling at 48 Park Avenue, Glyn Neath, SA11 5DR. This report constitutes a response to the Welsh Assembly's Technical Advice Note, TAN15.

There are three principal issues to be addressed in any Flood Consequence Assessment:

- The consequence of flooding on the development.
- The consequences of the development of the site upon flood risk elsewhere in the catchment for a range of potential flooding scenarios up to that flood having a probability of 0.1% (the 1,000 year flood).
- To establish the finished floor levels and propose flood access and egress routes.

TAN15 also requires other issues to be considered, such as site runoff and recommendations for drainage systems, which are included in appropriate sections.

1.2 Sources of Information and Consultation (A1.1)

This Report has been informed by:

- NRW modelling report and outputs for hydraulic modelling of the Rivers Neath undertaken by JBA on behalf of NRW.
- Information available on internet sites:
 - <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>
 - <http://lle.gov.wales/>

1.3 Structure of this Report

The Report has been structured in order to deal with each of the points raised in Appendix 1 (Assessing Flood Consequence Assessments) of Technical Advice Note (TAN 15) of the Welsh Assembly's Planning Guidelines. Where relevant, each sub-heading in this report incorporates the section number of Appendix 1, TAN15 in parentheses.

- Section 2 describes the existing site and the characteristics of catchments that affect the site
- Section 3 presents an assessment of the existing flood risk at the application site.
- Section 4 presents an assessment of flood risks associated with the proposed development along with any emergency plan.
- Section 5 presents a summary of the main findings.

The following Appendices are also provided:

- Appendix A TAN15 Requirements

2. SPATIAL PLANNING CONSIDERATIONS

2.1 The Site

The site of proposed development is at 48 Park Avenue, Glyn Neath, SA11 5DR (Figure 1, Figure 2 and

Table 1), which is located to the north of the nearest bank of River Neath. Access to the site would be from the Park Avenue, off the northern boundary of the site. The proposal is for a replacement of a 3 bedroom dwelling with similar accommodation. The building is approximately 53m from a local drain running along the A465 Road embankment and 187m from the nearest bank of the River Neath.

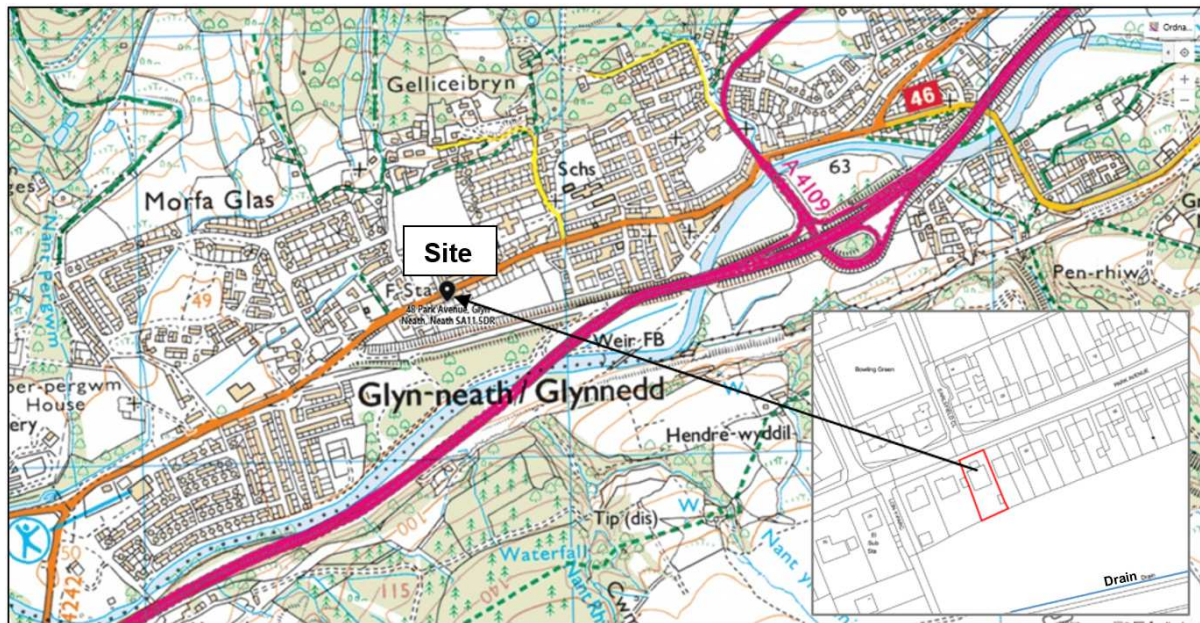


Figure 1: Location of the Development Site (Source: Bing Maps and Blandford Consulting)

Table 1: Grid reference details for the site (www.streetmap.co.uk)

Reference	Value
OS X (Eastings)	287724
OS Y (Northings)	206366
Nearest Post Code	SA11 5DR
Lat (WGS84)	N51:44:41 (51.744709)
Long (WGS84)	W3:37:40 (-3.627641)
Nat. Grid	SN877063 / SN8772406366

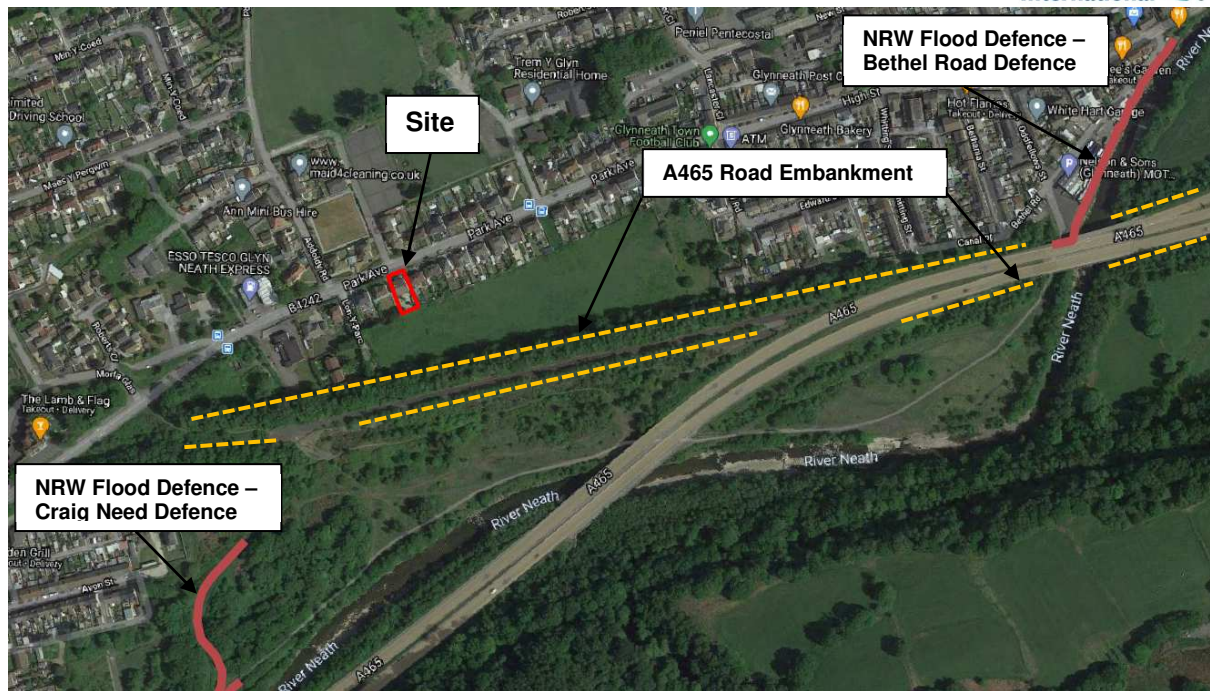


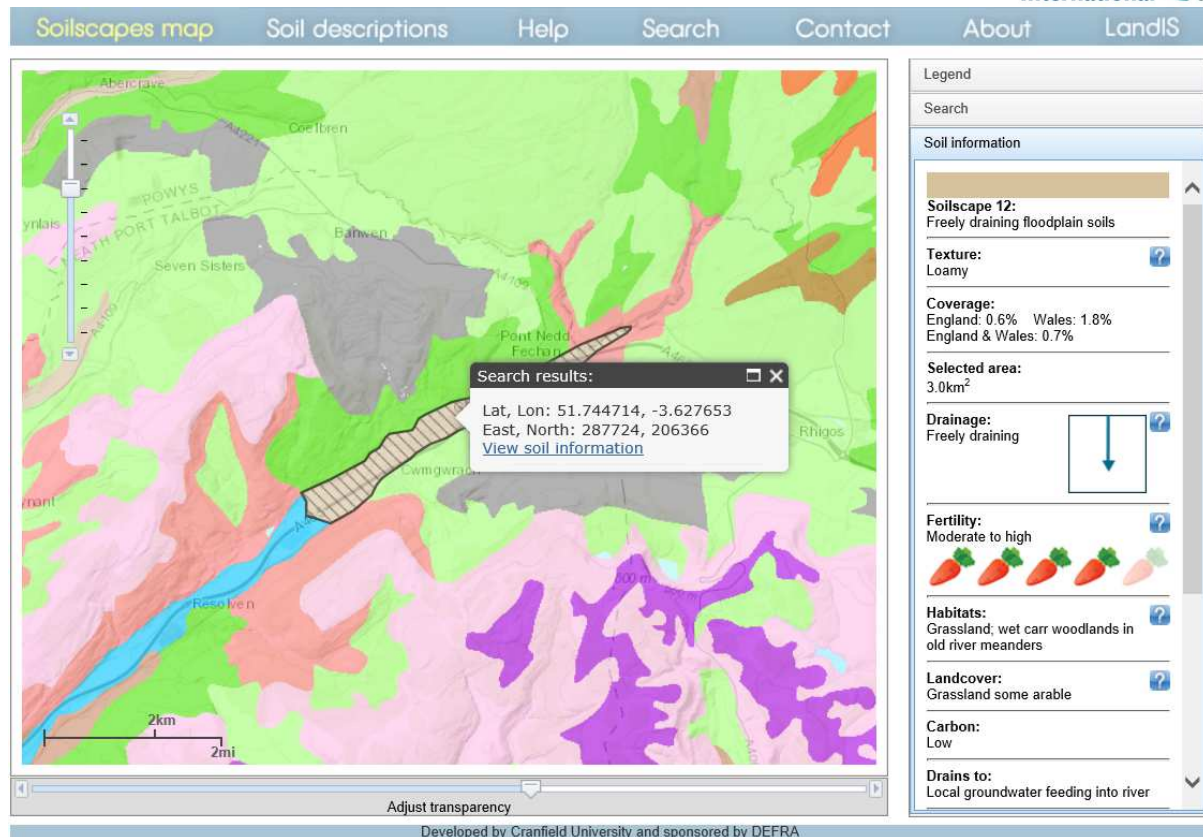
Figure 2: Google Satellite of the Site

2.2 Topography

The topography of the site is shown in Figure 3. The site is shown to slope gently in a south-westerly direction. The land level around the buildings varies between 53.04mAOD and 52.42mAOD. The existing finished floor level (FFL) within the main house is approximately 52.91mAOD, and the FFL within the garage in the rear garden is approximately 52.8mAOD. The site access is at around 53.03 mAOD.



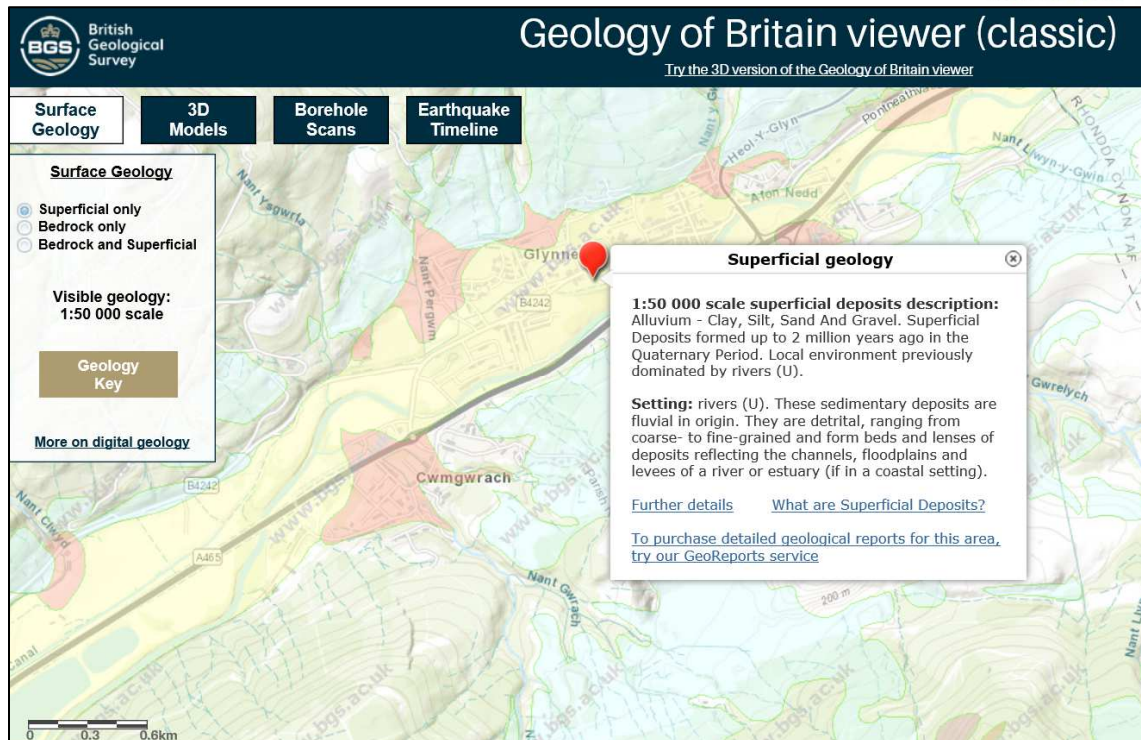
Soils at the site are described on the Cranfield University “Soilscapes” website as, ‘Freely draining floodplain soils’ (Figure 4). The land around the existing building is permeable rough ground with concrete aprons to the east of the building and a small one at the rear garden.



Source: Cranfield University Soil Mapping <http://www.landis.org.uk/soilsapes/>

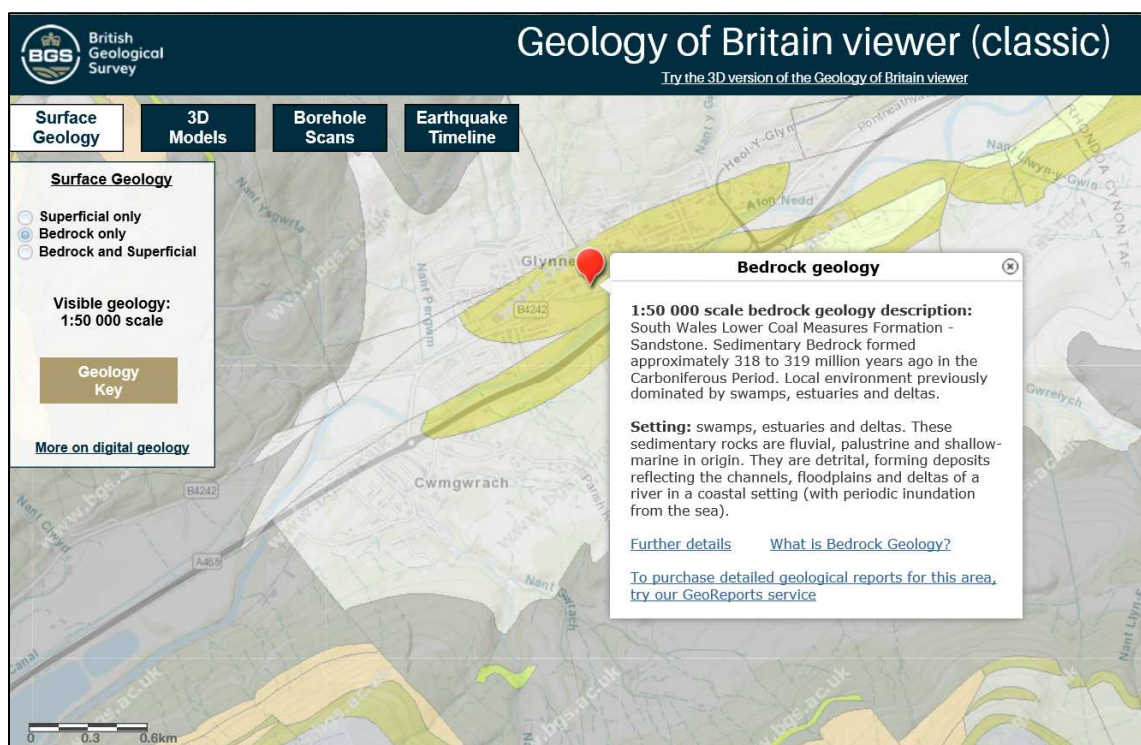
Figure 4: Soil Map of the Site and Surrounding Area

The geology at the site has been obtained from the BGS website. Superficial deposits are Alluvium – clay silt sand and gravel, while the underlying bedrock is sandstone (Figure 5 and Figure 6). Nearby borehole log (BGS ID: SN80NE25) in the same strata show no groundwater within the depth of 2.44m. It is believed that flooding and drainage is not impacted by groundwater.



Source: BGS Geology of Britain Viewer <http://mapapps.bgs.ac.uk/geologyofbritain/home.html?mode=boreholes>

Figure 5: Superficial Deposits Underlying the Site and Surrounding Area



Source: BGS Geology of Britain Viewer <http://mapapps.bgs.ac.uk/geologyofbritain/home.html?mode=boreholes>

Figure 6: Bedrock Underlying the Site and Surrounding Area

2.4 Catchment Data

The catchment draining the site is mapped in Figure 7, on which the approximate location of the site has been marked. The catchment size is 0.64 km². Catchment characteristics have not been obtained. It should be noted that the catchment covers an area with multiple soil types and a range of underlying strata so the characteristics may not necessarily be representative of a particular site.

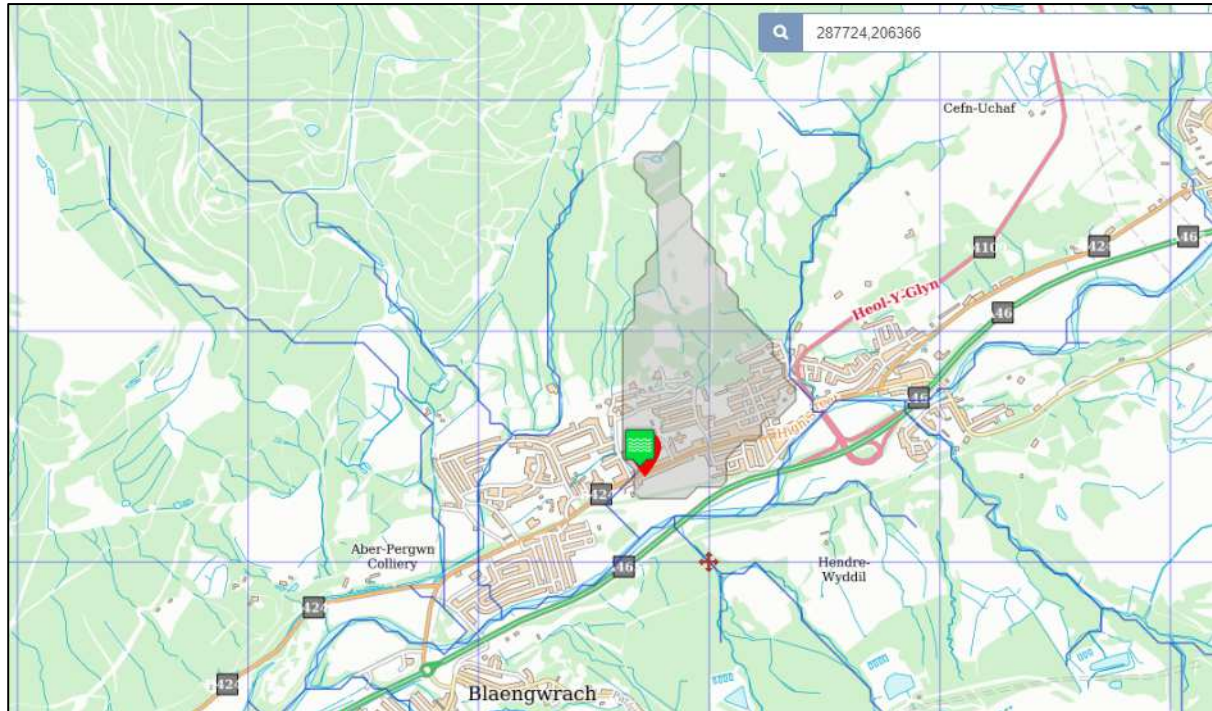


Figure 7: Catchment Boundary (FEH Web Service)

2.5 Natural Resources Wales Flood Zone

The Natural Resources Wales TAN 15 Development map (Figure 8) shows that the development site is located within Flood Zone C1: flood risk and served by significant infrastructure / flood defences.

The NRW Risk from River Flood Extent and Area Benefiting from Flood Defences Map (Figure 9) indicates the site is at low risk of fluvial flooding with the benefit from local defences – Neath Ufrn System.

The River Neath model report (Product 5) and model output data (Product 6) were obtained from NRW to confirm the flood levels, velocities, hazards at area of interest. Figure 10 shows the site is at risk of flooding for the 1:1000 year event for defended scenario, but maximum water level is very low (i.e. $\leq 0.1\text{m}$). Figure 11 presents the flood depth for 1:100 year event for the defended scenario, which suggests eastern edge of the site might at risk but the existing building should be dry.

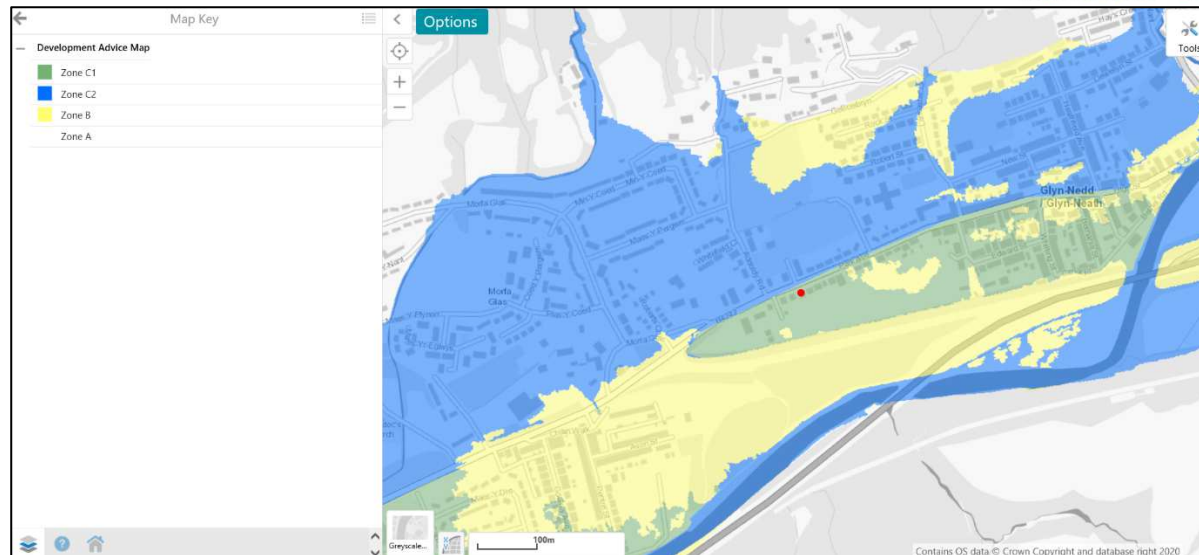


Figure 8: TAN15 Development Advice Map (Natural Resources Wales) (Red dot at site)

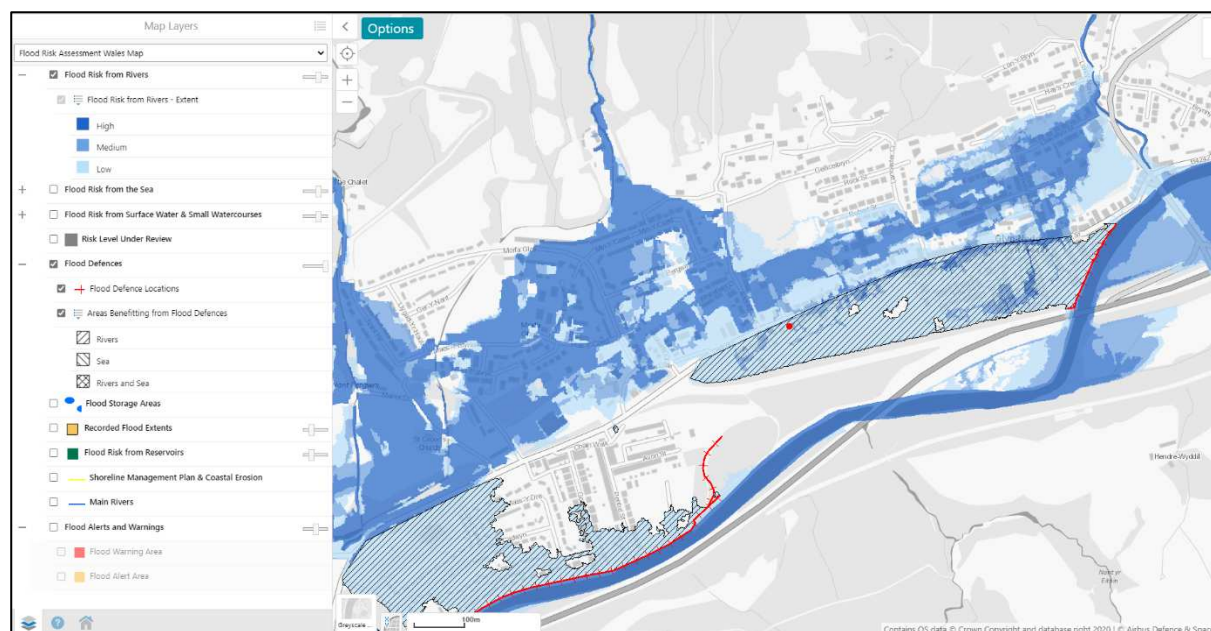


Figure 9: NRW Flood Risk from Rivers and Areas Benefitting from Flood Defences (Natural Resources Wales) (Red dot at site)



Figure 10: NRW Model Output 1:1000yr Flood Depth for Defended Scenario

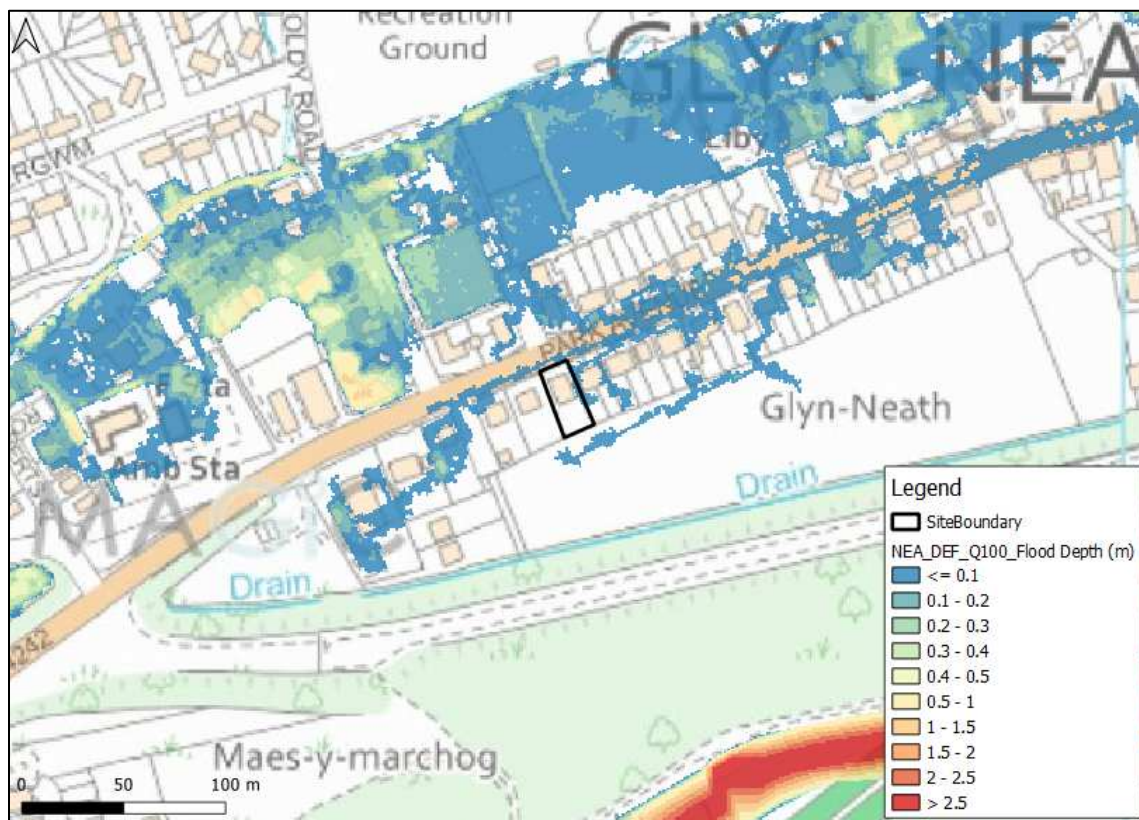


Figure 11: NRW Model Output 1:100yr Flood Depth for Defended Scenario

2.6 Justification Test

As stated in section 2.5 the development site falls within Flood Zone C1, benefiting from flood defences. Although there are defences, the report provided in NRW Product 5 does not provide level of protection of the defences.

The NRW Product 6 data shows flood levels of 52.8 mAOD ~ 53.0 mAOD were predicted along the eastern edge of the site for the 1:100 year flood event (Figure 12). The flood extent of this event appears to be on the eastern edge of the existing building. However, predicted level along the building edge is 52.9 mAOD, slightly lower than the inspection chamber (i.e. 52.91 mAOD) immediately outside the eastern edge of the building, and 520 mm lower than the existing building finished floor level (i.e. 53.42 mAOD). Therefore, the existing building is also dry during the 1:100 year flood event.

The predicted flood levels for the 1:1000 year event are between 52.7 mAOD and 53.0mAOD within the site boundary and approximately 52.9 mAOD and 53.0 mAOD around the existing building footprint. Given the existing building finished floor level of 53.42 mAOD, the existing building is dry during the 1:1000 year flood event, and flood depth surrounding the building is less than 0.1m, although the NRW Product 6 data shows the extents might cross the building (Figure 10). This is because the flood model does not consider detailed building finished floor levels.

The predicted flood levels for the 1:100 year plus 20% climate change event are between 52.7 and 53.0mAOD as well (Figure 14). The existing buildings (including the main and other buildings to the south) are dry, compared to existing ground elevations. The eastern edge is at risk of shallow flooding, less than 100mm deep.

It should be noted that there is no modelled flood level available for the 1:100 year plus 30% climate change, which is the appropriate climate change allowance for West Wales. It is assumed that the flood level for this event would be less than the 1:1000 year event (typically equivalent to 1:100yr+60 to 70%) so using the 1:1000 yr levels will produce a conservative assessment.

It is to be noted here that the proposed development is replacement of an existing residential building with the same number of bedrooms, thus previously on developed land and not increasing the potential number of residents. It is within a residential area in an existing settlement, beside and served by the Park Avenue. As above noted, the existing building will be dry up to the 1:1000 year flood event with land outside either dry or less than 100mm deep. The development would provide larger and more accessible bedrooms on the first floor with no changes in building footprint. Therefore, there will be no changes in flood risk on and offsite.

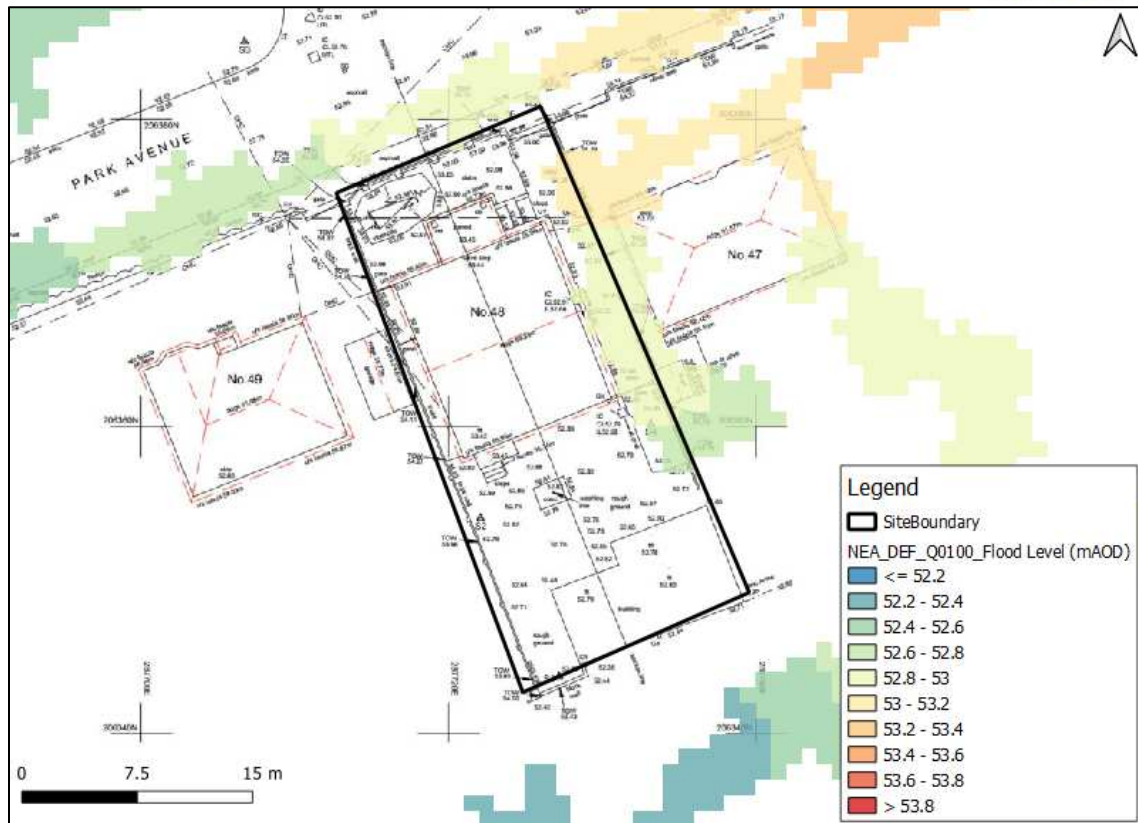


Figure 12: NRW Model Output 1:100yr Flood Level for Defended Scenario

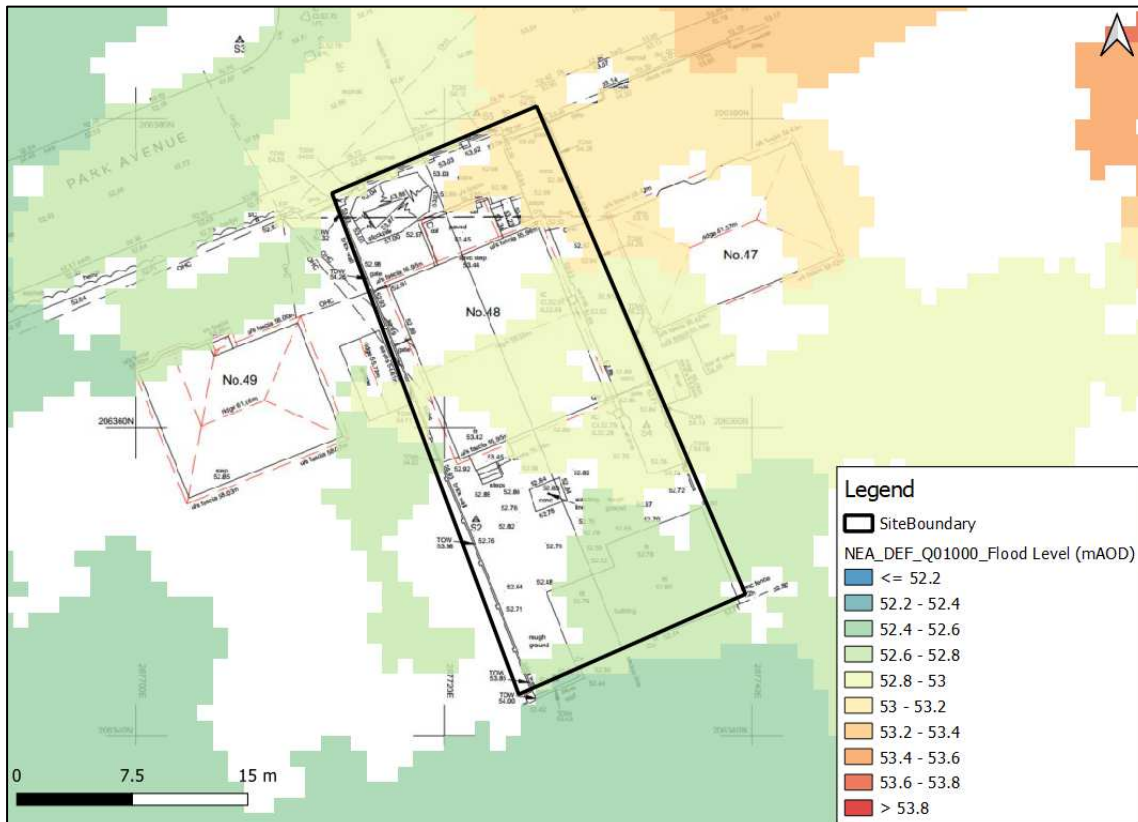


Figure 13: NRW Model Output 1:1000yr Flood Level for Defended Scenario

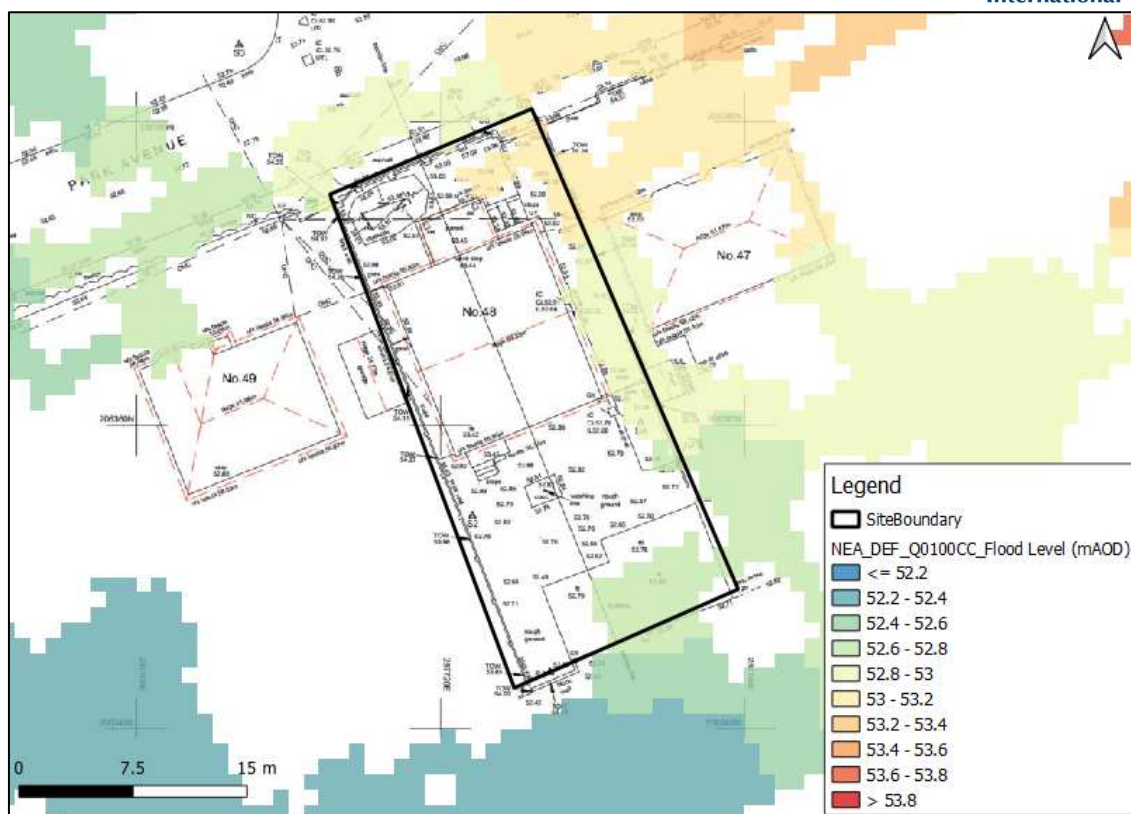


Figure 14: NRW Model Output 1:100+20% CC Flood Level for Defended Scenario

Table 2: Flood Risk Vulnerability and flood zone compatibility (TAN15 Pg.5)

Description of Zone		Use within the precautionary framework
Considered to be at little or no risk of fluvial or tidal/coastal flooding.	A	Used to indicate that justification test is not applicable and no need to consider flood risk further.
Areas known to have been flooded in the past evidenced by sedimentary deposits.	B	Used as part of a precautionary approach to indicate where site levels should be checked against the extreme (0.1%) flood level. If site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further.
Based on Environment Agency extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal)	C	Used to indicate that flooding issues should be considered as an integral part of decision making by the application of the justification test including assessment of consequences.
Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.	C1	Used to indicate that development can take place subject to application of justification test, including acceptability of consequences.
Areas of the floodplain without significant flood defence infrastructure.	C2	Used to indicate that only less vulnerable development should be considered subject to application of justification test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.

The Justification Test is set out in TAN15 and has four parts, all of which must be satisfied for development to be allocated or permitted.

- 1) Should be located in an area of flood risk which is developed and served by significant infrastructure, including flood defences;
- 2) Its location is necessary to assist a local authority regeneration initiative or strategy, or contribute to key employment objectives necessary to sustain an existing settlement or region;
- 3) the site meets the definition of previously developed land (i.e. it is not a Greenfield site) and concurs with the aim of Planning Policy Wales (i.e. the presumption in favour of sustainable development); and
- 4) a site-specific flood consequence assessment must demonstrate that the potential consequences of a flood event up to the extreme flood event (1 in 1000 chance of occurring in any year) have been considered and meet the criteria to be considered acceptable.

As discussed above, the development is a replacement of an existing residence within the development advice zone C1, thus fulfilling points 1 to 3, being on previously developed defended land sustaining an existing settlement. This report seeks to answer point 4.

3. FLOOD HAZARD FOR EXISTING SITE

3.1 Source of Flood Risk

A review of flood sources is given in Table 3, which shows possible causes at the site. As discussed in Section 2.5, the proposed site is in Flood Zone C1 (Figure 8) and at low risk of fluvial flooding (Figure 9).

The NRW model output data compared to the existing site ground elevations, as presented in section 2.6, shows that the existing building would be dry for up to the 1:1000 year flood event, although surrounding land would have a flood depth of up to 100 mm for 1:1000 year event and at the eastern edge of the site the flood depth was predicted to be up to 100mm for 1:100 year event and 1:100 plus 20% climate change event. It should be noted that there is no significant change in flood levels for defended and undefended scenario at the site.

Natural Resources Wales surface water flood risk map (Figure 15), shows the site to be at 'very low' risk of surface water flooding, with less than 1:1000 annual probability of flooding. There are no records of groundwater flooding, sewer flooding or surface water flooding at the site. According to NRW flood risk maps, fluvial flood risk is low as discussed, and there are no historical records of flooding at this site and surrounding land. Potential risk from three reservoirs, including Pendervn, Ystradfellte and Llyn-Fawr is extremely unlikely (Figure 16). There is also no historical record of infrastructure failure at this location.

Table 3 Possible sources of flood risk

Key sources of flooding	Possibility at Site
Fluvial (Rivers)	Flood zone C1, low risk Figure 9
Tidal	NA
Groundwater	Very low, no groundwater is evident in the underlying strata
Sewers	Very low, No records
Surface water	Very low Figure 15
Reservoir	Extremely unlikely, potential risk from reservoirs: Pendervn, Ystradfellte and Llyn-Fawr Figure 16
Infrastructure failure	No other known infrastructure close to site

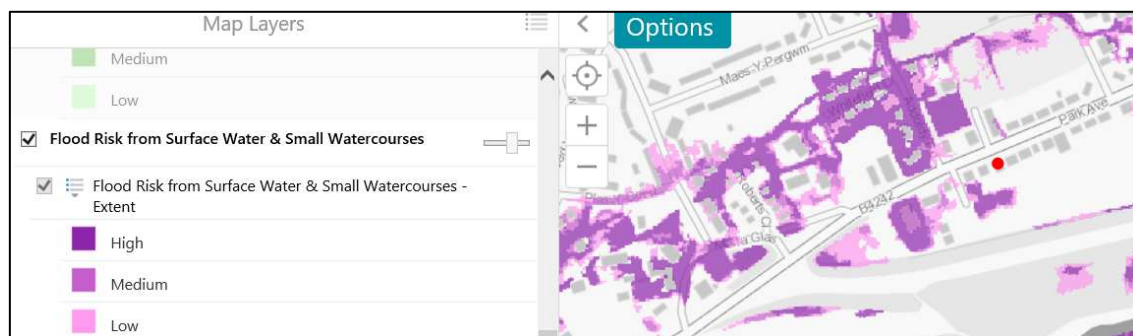


Figure 15: Natural Resources Wales' Surface Water Flood Risk Map (building marked in red)

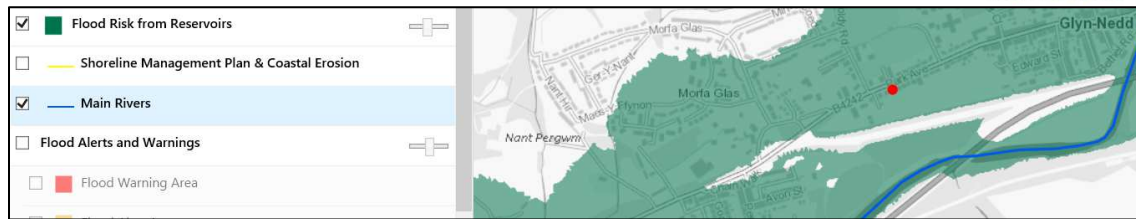


Figure 16: Natural Resources Wales' Flood Risk from Reservoirs (building marked in red)

3.2 Flood Mechanisms

The site is shown to slope gently in a south-westerly direction. Examination of the NRW product 6 data shows the site is at fluvial flood risk for 1:1000 year event and its eastern edge may be at risk from 1:100 year event, with flood depths sloping in a south-westerly direction as well.

The NRW map of Flood Risk from Rivers and Areas Benefitting from Flood Defences (Figure 9) indicates that the site benefits from local flood defences, although the level of protection is unknown. It should be noted that there is no significant change in flood levels for defenced and undefended scenario at the site.

Therefore, flooding at the site and its surrounding land is not directly from the River Neath with the nearest bank at approximately 187 m south of the site. The most likely flood mechanism is water overtopping the right-bank of the Nanty Gwyddly, a tributary of River Neath, at approximately 770m northeast of the site, following south-westerly in a shallow sheet down the floodplain. Figure 17, Figure 18 and Figure 19 show the flood velocity at the area of interest for 1:30 year, 1:100 year and 1:1000 year flood events, which indicates the potential flood paths. The site is more of a flood flow path than flood storage (Figure 10).

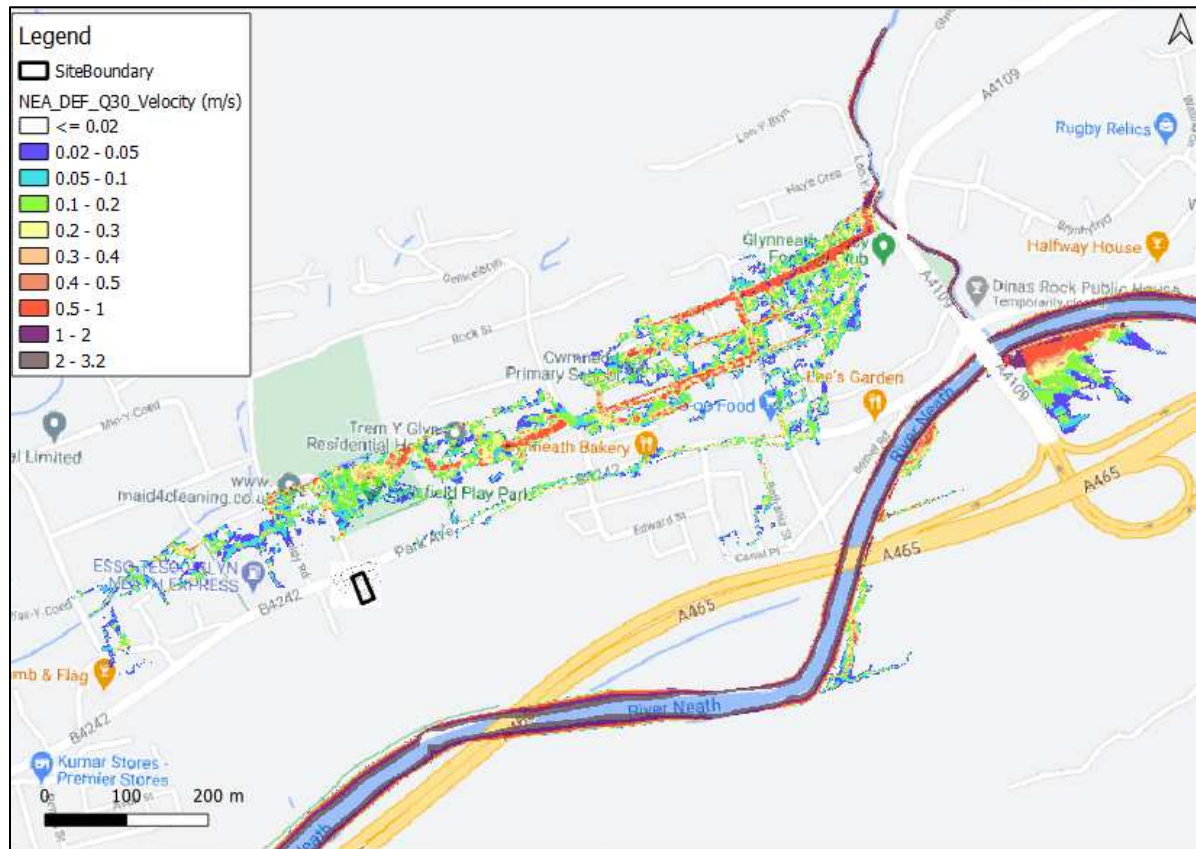


Figure 17: NRW Model Output Defended 1:30yr Flood Velocity

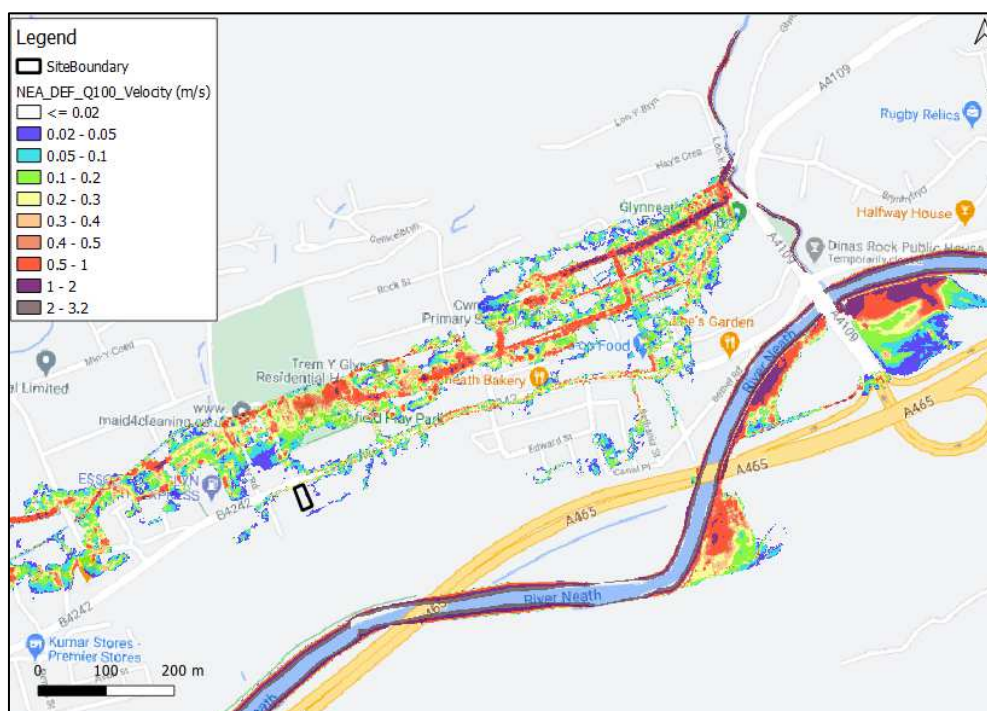


Figure 18: NRW Model Output 1:100yr Flood Velocity

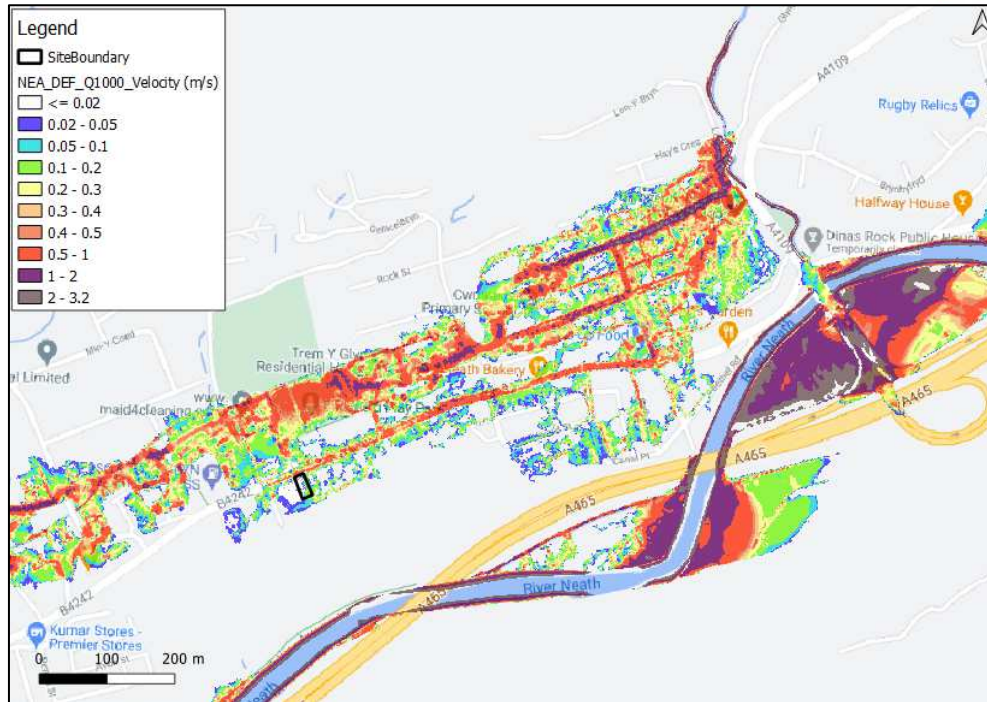


Figure 19: NRW Model Output 1:1000yr Flood Velocity

There are no areas of pooling causing surface water flood risk, and at approximately 20m southwest of the site there is a greenfield area with a high risk of surface water flooding. The BGS borehole record surveys show that no shallow groundwater has been detected near the site.

4. ASSESSMENT OF FLOOD RISK FOR PROPOSED DEVELOPMENT

4.1 The Development Proposals

The proposed development is a replacement 3 bedroom, 2 storey dwelling (Figure 20). The total impermeable areas on site would be reduced from 158 m² to 127 m².

Table 4 shows the details of the existing and proposed impermeable areas within the site.

Table 4 Impermeable area of development

Area Description	Existing (m ²)	Proposed (m ²)
Main building roof areas	150	128
Other building roof areas	69	(as existing)
Other concrete area within the site	74	65
Total	355.57	296.89



Figure 20: Existing and Proposed Site Layout (source Blandford Consulting)

4.2 Flood Risk Management Measures to Protect the Site (A1.5, A1.6, A1.7, A1.8, A1.11)

4.2.1 Appreciation of dangers (A1.5)

As shown in Section 3, the proposed development site is within Flood Zone C1 (Figure 8) and at low risk of fluvial flooding (Figure 9). It is at low to very low risk from all other forms of flooding. Comparison of the site survey with modelled flood levels shows that the main building with a finished floor level of

53.42mAOD is dry for up to the 1:1000 year flood (Figure 13 and Figure 15), and flood depths of up to 100mm were predicted at surrounding areas for the 1:1000 year event. It should be noted that there is no modelled output for 1:100 year plus 30% so the 1:1000 year event have been used as a proxy for this event. For the 1:100year plus 20%CC event (Figure 14), there are shallow depths of less than 100mm along the eastern edge of the site. There are no proposed building entrances within the 1:100 year+20%CC flood envelope.

4.2.2 Appreciation of blockage (A1.6)

The flood mapping and levels referred to in this report are taken from the products 5 and 6 data provided by NRW. This includes the report and results of the JBA modelling work carried out in 2013 on behalf of NRW (JBA 2013). It is noted that the model is particularly sensitive to decrease in structure area (i.e. blockage) and surcharging of an access bridge (GWYD.13B at E288359.72, N 206905.99) results in additional flooding to the west of Glyn Neath. This access bridge is at approximately 812m to the northwest of the site, crossing the Nanty Gwyddly, the tributary of River Neath. There is no further information regarding the extent and levels of this blockage scenario. However, the adverse impact at the site is considered to be low given the distance and local topography.

4.2.3 Finished Floor Levels

The existing finished floor level of the main building is 53.4mAOD. The proposed finished floor levels within the building will be set at 300 mm above the predicted 1:1000 year flood level provided within the NRW product 6 data, 53.3 mAOD or as existing (53.4mAOD).

4.2.4 Appreciation of structural adequacy (A1.7)

There are NRW flood defences (Bethel Road defence, Craig Need defence) and N465 Road Embankment within the local area of the site. Also, there are walls along the northern and eastern boundary of the site.

The development will have flood resistant and resilient construction.

4.2.5 Awareness of Flooding Consequences and Access/Egress arrangements (A1.16)

As described in Section 4.2, the proposed development is located in the current Flood Zone C1. The main building is dry for up to 1:1000 year flood event, while eastern part of the site is flooded with a depth of up to 100mm for 1;100 year, 1:100 year plus climate change, and 1:1000 year events.

The B4242 road adjacent to the site is flooded during 1:100 year event and there would be no dry access route off the site for climate change event or 1:1000 year event. However, the flood hazard is zero for 1:100 year, 1:100 year plus climate change and 1:1000 year events as the flood depths at site or adjacent road and its west side are less than 100 mm and the velocities are less than 0.8m/s for all these three events. See Figure 21 for the determination of hazard category for 1:1000 year event. Therefore, emergence access /egress route would be from the entrance to main road and turn left towards dry land to further southwest.

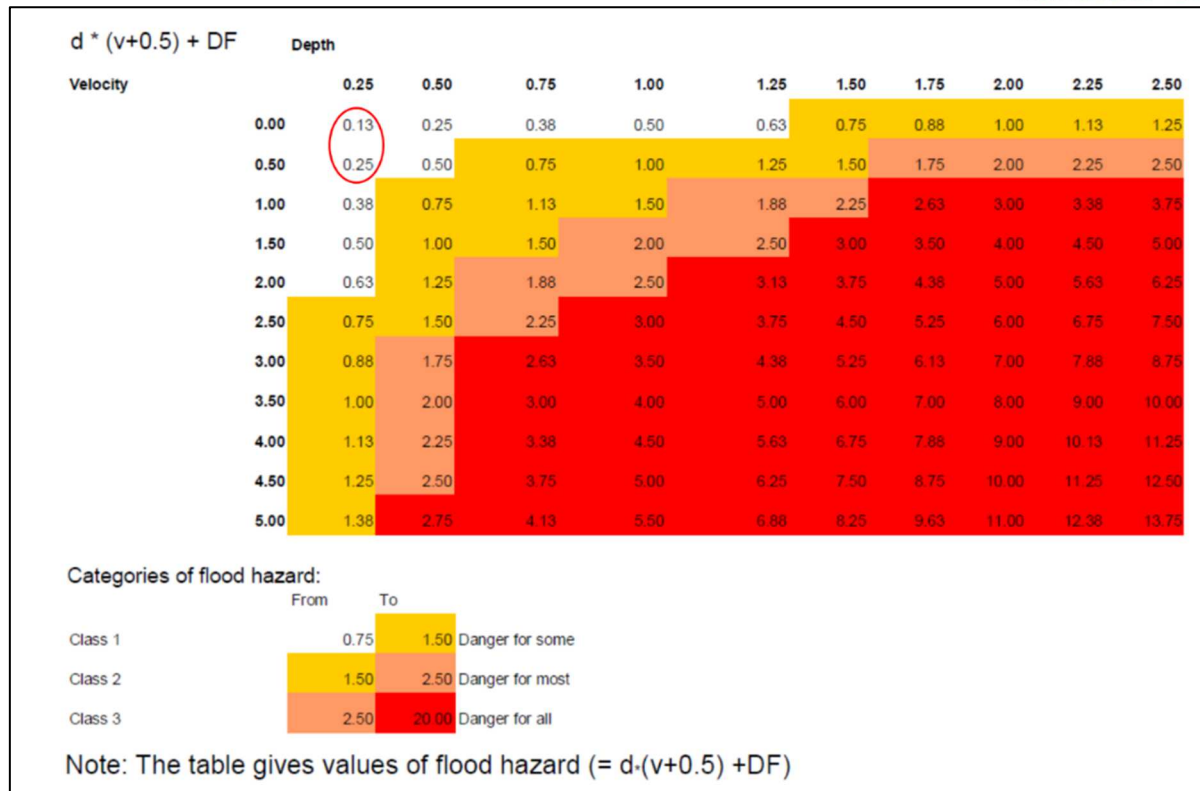


Figure 21: Determination of flood hazard (1:1000 year hazard (ringed in red) Source: Defra/EA 2008

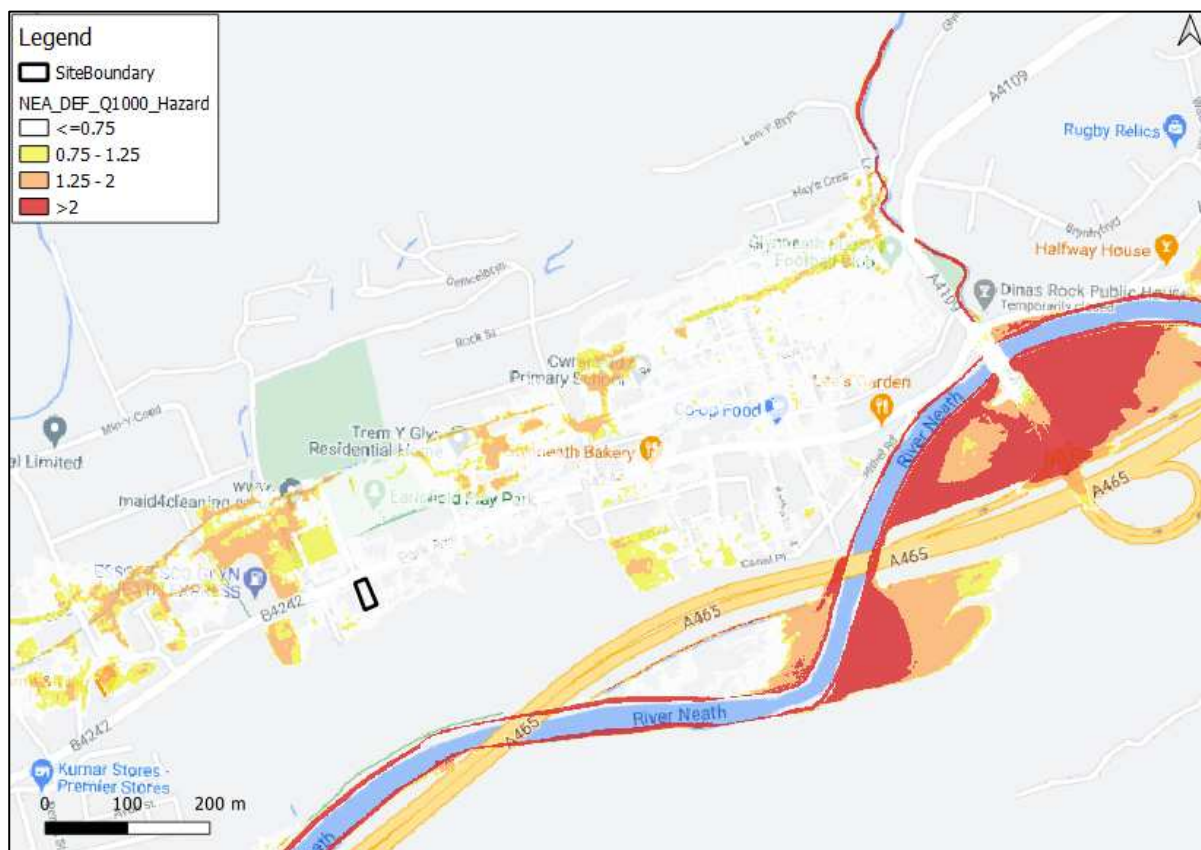


Figure 22: NRW Model Output 1:1000yr Flood Hazard

4.3 Management of Flood Consequences elsewhere in the Floodplain (A1.9)

4.3.1 General

The proposed development would reduce the building footprint and the impermeable area of the site so is not expected to adversely impact flood risks elsewhere in the flood plain.

4.3.2 Flood Plain Storage and Flood Flow

TAN15 requires that the proposed development does not lead to an increase in flood risk elsewhere. Thus, any development within Flood Zone C must not take up flood plain storage or obstruct flood flow paths.

As discussed in section 4.1 (

Table 4 and Figure 20) the development footprint will be reduced by approximately 22 m². It should be noted that existing main building is dry for up to 1:1000 year event and the proposed building is within the existing main building footprint. Therefore, there would be no loss of flood plain storage. Also, the flood flow path would not be changed significantly given the very shallow flood depth (< 100 mm) and small velocity (< 0.1 m/s) around the existing building during 1:1000 year event.

4.3.3 Surface Water Management

The impermeable area of the site will be reduced by the development (

Table 4). The runoff generated by the site will be reduced by the development, providing a benefit. It may be possible to discharge roof runoff to a soakaway, subject to infiltration testing, providing an even greater benefit. Otherwise roof runoff will be discharged to the existing local drainage network via the existing connection.

4.4 Residual Risks

Residual risks include the need to manage storms of a significantly greater magnitude than those considered in this report or poor maintenance of any infiltration structure. Structures which manage surface water runoff require little maintenance, however a regular maintenance schedule, on a monthly basis and after heavy rainfall, should be established by the property owners/ designated maintenance company to reduce the risk of blockage within the drainage system and ensure the systems remain in good working order. Manholes should be included in the system design to allow access for maintenance to take place.

It should be noted that there is no significant change in flood levels for defenced and undefended scenario at the site. Therefore, residual risk at the site is considered to be minimal.

4.5 Climate Change Impacts

The general impacts of climate change on flood behaviour in England and Wales remain unclear. The FEH (Institute of Hydrology, 1999) describes a review of flood peak data to investigate possible trends. The analyses do not show that climate change has affected UK flood behaviour, but neither do they

prove that it has not affected it. TAN15 requires a consideration of the impacts of climate change on the flood risk for any proposed development. Guidance on climate change allowances is available (Welsh Government 2016). The recommended climate change allowance for West Wales is 30%.

The flood level for 1:100 year plus 30% climate change is not available so the 1:1000 year flood level has been taken as proxy. The most recent flood modelling update for the 2013 hydraulic model of the River Neath was carried out in 24 Sep 2019. As described in section 2.6 and 4.2, the existing main building will be dry for up to 1:1000 year event and flood depth on site is less than 100mm. The proposed building is within the existing footprint and the finished floor level will be set to 300mm above the 1:1000 year flood level (53.3mAOD) or the same as the existing finished floor level (53.4mAOD). Therefore, the proposed development will be flood free during the climate change event for its lifetime.

4.6 Qualifications of those undertaking Flood Consequence Assessment (A1.10)

Alan Corner: Project Director

Alan Corner, is Head of Engineering and Flood Risk at Hydro-Logic Services. He is a surface water management and SuDS expert as well as a civil engineer who has specialised in drainage networks for the last 35 years, having worked with CIRIA on the 2015 revision of the SuDS Manual and assisted DEFRA in drafting the National SuDS Standards.

Alison Clare-Dalgleish: Project Manager and Principal Hydrologist

Alison Clare-Dalgleish is a Hydrologist with 25 years' experience in water resources, hydrometry and flood risk. She has undertaken and managed numerous flood studies, flood risk assessments and flood consequence assessments including surface water management systems

Yiwen Zhao: Principal Flood Risk Analyst

Yiwen Zhao is a Hydrologist and Hydraulic Modeller with over 8 years' academic research experiences in fluvial geomorphology and hydrology, and over 12 years' engineering consulting experiences in river and coastal sector, contributing skills from 1D/2D hydraulic modelling and hydrological analysis to flood risk assessment /flood consequence assessment, surface water management, strategic flood risk management, flood forecasting and detailed design of flood mitigation

5. SUMMARY AND CONCLUSIONS

This Report presents a Flood Consequence Assessment for the proposed a replacement of a 3 bedroom dwelling with similar accommodation at 48 Park Avenue, Glyn Neath, SA11 5DR..

The outcomes of the work are summarised as follows:

- i. Existing Flood risk maps show that the proposed development site is within Flood Zone C1.
- ii. The existing main building will remain dry up to 1:1000 year event, although western part of the site will be at risk for 1:100 year event
- iii. There is no modelled data available for 1:100 year plus 30% climate change event and it is assumed that the level of this event will be less than the 1:1000 year (i.e. less than 100mm).
- iv. The development is at “low” to “very low” risk of flooding from all other sources.
- v. Proposed finished floor levels at the site will be 300mm above the 1:1000 year flood level (53.3mAOD) or as existing (53.4mAOD), and the development will remain dry during the extreme flood.
- vi. It is recommended that the residents register with ‘Floodline Warning Direct’.
- vii. There will not be dry access during the 1:100 year plus 30% climate change event or the 1:1000 year event. The main road and entrance will have flood water of less than 100mm and the hazard is zero. The access and egress will be dry during the 1:100 year flood.
- viii. The development will reduce the footprint of the existing main building, thus will not take up any additional flood plain.
- ix. Flood flow paths are on site currently and will continue to flow through an open space behind the building, unobstructed.
- x. The impermeable area of the site will be reduced, thus reducing the potential runoff and providing a benefit.

In summary, the proposed development will not have adverse impact on flooding at the site and elsewhere in the floodplain.

6. REFERENCES

Author	Date	Title/Description
British Geological Survey	2019	BGS Geology of Britain Viewer http://mapapps.bgs.ac.uk/geologyofbritain/home.html?mode=
Centre for Ecology and Hydrology.	2019	The Flood Estimation Handbook Web Service https://fehweb.ceh.ac.uk/GB/map
Cranfield University	2019	Soilscapes Map. Available at: http://www.landis.org.uk/soilscapes/
Defra/EA	2008	Flood and Coastal Defence Programme; Flood Risks to People Phase 2 FD2321/TR2 Guidance Document
JBA	2013	Hydraulic Modelling User Report: River Neath 1D-2D Flood Hazard Modelling
JBA	2019	Model Update Report 1 and 2
Natural Resources Wales	2019	Natural Resources Wales Interactive Flood Map and TAN15 Development Advice Map. Available at: https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en
Welsh Assembly	2004	Technical Advice Note 15. Development and Flood Risk, July 2004.
Welsh Government	2019	http://lle.gov.wales/map#m=-3.74639,51.74329&b=Europa&l=
Welsh Government	August 2016	Climate change allowances for planning purposes. Available at: http://gov.wales/topics/planning/policy/policyclarificationletters/2016/cl-03-16-climate-change-allowances-for-planning-purposes/?lang=en
Neath Port Talbot County Borough Council	June 2013	Local Flood Risk Management Strategy

Appendix A: TAN 15 Requirements

Table A-1 follows the bullet points in Section A1.12 of TAN15.

Table A-1 Conditions of Acceptability Criteria (A1.12)

No	Conditions of acceptability criteria (A1.12)	Check
1	Flood defences must be shown by the developer to be structurally adequate particularly under extreme overtopping conditions (i.e. that flood with a probability of occurrence of 0.1%)	<i>The local flood defences are maintained by NRW. There is no significant difference between defended and undefended modelled results.</i>
2	The cost of future maintenance for all new/approved flood mitigation measures, including defences must be accepted by the developer and agreed with the Natural Resources Wales	<i>The proposed flood mitigation measures comprising raising finished floor levels above the 1:1000 year flood level will be included in the build cost of the development and thus entirely borne by the developer.</i>
3	The developer must ensure that future occupiers of development are aware of the flooding risks and consequences	<i>This and any subsequent FCA reports should be available to future owners.</i>
4	Effective flood warnings are provided at the site	<i>The land owner has been advised to register with the Flood Warning Services.</i>
5	Escape/evacuation routes are shown by the developer to be operational under all conditions	<i>The flood water at the site entrance / outside the building will be no deeper than 100mm with zero hazard, although there is no dry access for 100yr+CC or 1:1000yr event</i>
6	Flood emergency plans and procedures produced by the developer must be in place	<i>No procedures necessary</i>
7	The development is designed by the developer to allow the occupier the facility for rapid movement of goods/ possessions to areas away from the floodwaters	<i>The finished floor level of the development is above the 1:1000 yr flood level so possessions and good will be above flood waters.</i>
8	Development is designed to minimise structural damage during a flooding event and is flood proofed to enable it to be returned to its prime use quickly in the aftermath of the flood	<i>The development will be flood resilient construction.</i>
9	No flooding elsewhere	<i>The proposed development is replacement of an existing building with similar accommodations. The building footprint on site will decrease thus, no additional flood plain storage will be taken up and no additional runoff will be generated.</i>

Technical Requirements for Assessing Flooding Consequences

The technical requirements listed in Appendix 1E of TAN15 are considered in Table A-2 of this Flood Consequence Assessment.

Table A-2 Technical Requirement Checklist

No.	Short Description (See Appendix 1E)	Cross-Reference
1	A location plan identifying all possible sources of flooding including overtopping of existing defences.	<i>Location maps are given in section 2.1, Identification of sources of flooding and flood maps are shown in Section 3</i>
2	A plan of the site showing existing levels related to Ordnance Datum, both current and following the proposed development.	<i>Existing topography is shown in Figure 3 The topography will remain unchanged outside the building. Finished floor levels will increase to 300 mm above the 1:1000 year flood or as existing.</i>
4	A plan of the area showing access/evacuation routes from the proposed development site, giving existing levels relative to Ordnance Datum.	<i>The evacuation routes are as normal egress from the building to site entrance and then to the west of the main road, since the hazard on and off site is zero. Existing levels are given in Figure 3</i>
6	A plan of the site showing any existing information on extent and depth of flood events or on flood predictions.	<i>Flood maps of the 1:1000yr flood depth and level are shown in Figure 10 and Figure 13.</i>
9	Cross-sections of the site showing proposed finished floor levels or road levels, or other relevant levels relative to the source of flooding, and to anticipated water levels and associated probabilities.	<i>The proposal is a replacement of existing main building. The finished floor level will be 300mm above the 1:1000 year flood or as existing, as described in Section 4.2.3.</i>
12	An estimate of the volume of water that would be displaced from the site for various flood levels following development of the site and of the run-off likely to be generated from the development	<i>The proposed development is inside the existing building footprint and finished floor levels will be 53.3mAOD or as existing 53.4mAOD and therefore no loss of volume for flood storage. The proposed development has a smaller impermeable area than the existing site Table 4. Runoff will be reduced by the development.</i>
13	An assessment of the likely impact of any displaced water on neighbouring or other locations which might be affected subsequent to development. This should address the potential for change of the flooding regime both upstream and downstream of the site due to ground raising or flood embankments.	<i>There is no off-site impacts as the ground raising is as existing or 100mm lower than existing and it is within the existing building footprint.</i>
16	An assessment of the residual risks after the construction of any necessary defences. Consideration should always be given to the behaviour of any new or modified defences in extreme events greater than those for which they are designed, and information should be provided on the consideration given to minimising risks to life in such circumstances.	<i>Other than floor raising and flood resilience no defences are proposed.</i>

17	The report should include a clear and comprehensive summary describing the items listed in Appendix A1E 17	<i>This Table</i>
----	--	-------------------



Offices at

Clevedon

Exeter

Malvern

Reading

Sheffield

Stirling

Warrington

Registered office

Hydro-Logic Services (International) Ltd

Shearwater House,

Clevedon Hall Estate,

Victoria Road,

Clevedon,

BS21 7RD

Registered in England 03036787