



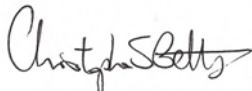
Flood Consequence Assessment

Brynmorgan Villa, Upper Cwmtwrch, SA9 2XG

On Behalf of

Springboard Education and Care

Quality Management

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Date:	October 2022	
Revision:	Version 1	
Project Number:	HYG1087	



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Appendices

Appendix 1 Existing and Proposed Site Layout

1 Introduction

1.1 Background

This Flood Consequence Assessment (FCA) has been prepared by Hydrogeo at the request of Springboard Education and Care, to support a planning application for the proposed development at Brynmorgan Villa, Upper Cwmtwrch, SA9 2XG.

This FCA has been carried out in accordance with guidance contained in Technical Advice Note 15 Development and Flood Risk (TAN15)¹ and associated Development Advice Maps. This FCA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

It is recognised that developments which are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. The development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling all or part of the development, as a result of flood risk issues.

1.2 Technical Advice Note 15 (TAN15)

One of the key aims of TAN15 is to ensure that flood risk is taken into account at all stages of the planning process; to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk.

It advises that where new development is exceptionally necessary in areas of higher risk, this should be safe, without increasing flood risk elsewhere, and where possible, reduce flood risk overall.

A risk-based approach is adopted at stages of the planning process, applying a source pathway receptor model to planning and flood risk. To demonstrate this, an FCA is required and should include:

- whether a proposed development is likely to be affected by current or future flooding from all sources;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate; and
- satisfy the justification test, including the acceptability of consequences.

A revised TAN15 is due to be implemented in June 2023. This will be supported by the new Flood Map for Planning, which includes climate change information to show how this will affect flood risk extents over the next century. It shows the potential extent of flooding assuming no defences are in place.

1.3 Report Structure

This FCA has the following report structure:

- Section 2 details the sources of information that have been consulted;

- Section 3 describes the location area and the existing and proposed development;
- Section 4 outlines the flood risk to the existing and proposed development;
- Section 5 outlines the mitigation measures used to reduce the flood risk;
- Section 6 justifies the location of the development; and
- Section 7 presents a summary and conclusions.

2 Sources of Information

2.1 Discussion with Regulators

Consultation and discussions with the relevant regulators have been undertaken during this FCA including Natural Resources Wales, the Local Planning Authority (LPA) and the Sewerage Undertakers.

2.1.1 Natural Resources Wales

The Flood and Water Management Act 2010 gives Natural Resources Wales a strategic overview role for all forms of flooding and coastal erosion. They also have direct responsibility for the prevention, mitigation and remediation of flood damage for main rivers and coastal areas. Natural Resources Wales is the statutory consultee with regards to flood risk and planning.

Natural Resources Wales Flood Risk Standing Advice and TAN15 have been consulted and reviewed during this FCA. This has confirmed the level of FCA required and that a surface water drainage assessment is to be undertaken. Information regarding the current flood risk at the application site and local flood defences has been obtained from Natural Resources Wales.

2.1.2 Neath Port Talbot Council

Neath Port Talbot Council is the LPA, and the Sustainable Drainage Approval Body (SAB) and therefore, has responsibilities for 'local flood risk', which includes surface runoff, groundwater and ordinary watercourses. Planning guidance written by Neath Port Talbot Council regarding flood risk was consulted to assess the mitigation policies in place.

The Neath Port Talbot Council Strategic Flood Consequence Assessment (SFCA) which covers the site have been reviewed. Separate approval will be required from the SAB relating to the management surface water runoff from the proposed development.

2.1.3 Welsh Water/Dŵr Cymru

Welsh Water/Dŵr Cymru is responsible for the disposal of waste water and supply of clean water for this area. Information with regards to sewer and water main flooding contained within the Neath Port Talbot Council SFCA has been consulted as part of this FCA. All Water Companies have a statutory obligation to maintain a register of properties/areas which are at risk of flooding from the public sewerage system, and this is shown on the DG5 Flood Register.

3 Location & Development Description

3.1 Site Location

The site is located at Brynmorgan Villa, Upper Cwmtwrch, SA9 2XG (see Figure 3-1). The National Grid Reference (NGR) of the site is 275717, 210866. The site is accessed from the A4068 - Heol Gwys road to the east of the site with bridges over the Afon Twrch.

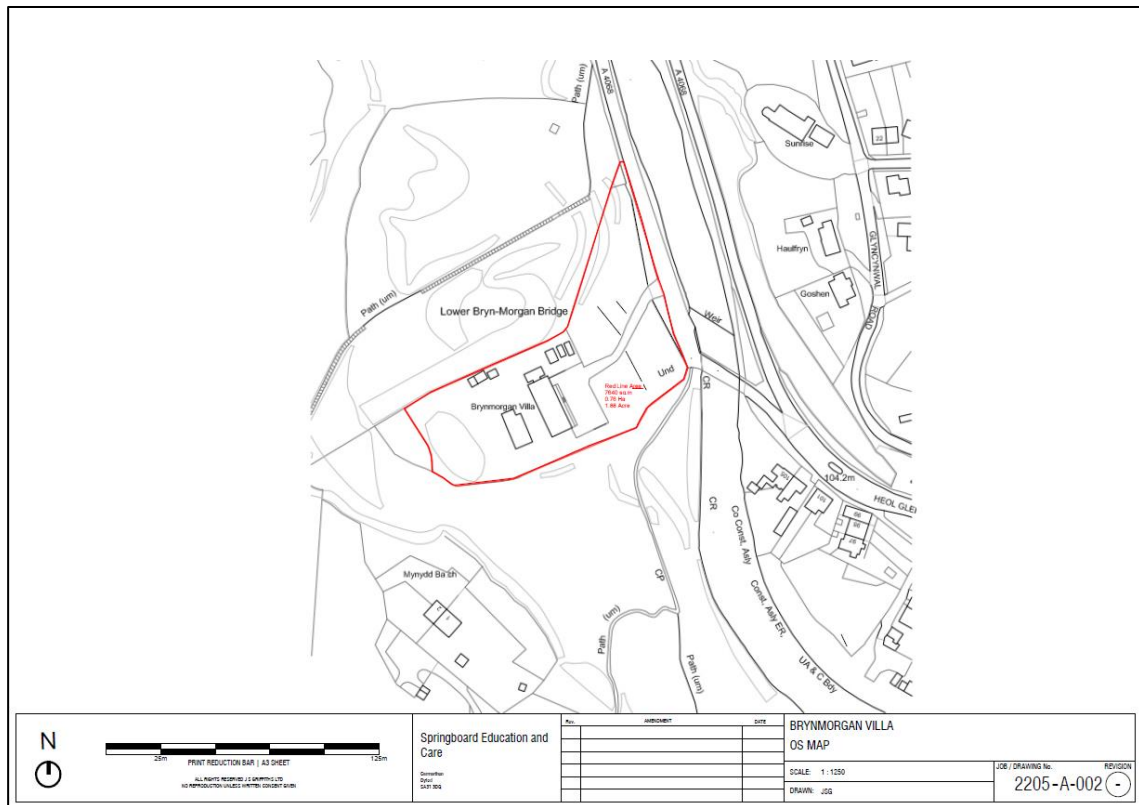


Figure 3-1 Site Location

3.2 Existing Development

The site currently comprises a residential care home for 4 young people and a number of unused outbuildings/sheds on the periphery of the site (see Appendix 1).

3.3 Proposed Development

The proposals are for the conversion of the outbuildings to form ancillary self-contained units to increase the number of young people from 4 to 8 (see Appendix 1).

3.4 Ground Levels

The site falls from west to east with a maximum ground level of 137.56 metres Above Ordnance Datum (mAOD) and a minimum ground level of 107.61mAOD. The entrance to site has a ground level of 108.86mAOD rising to 111.77mAOD on the A4068 - Heol Gwys road to the east of the site.

3.5 Catchment Hydrology/Drainage

The Afon Twrch is located immediately adjacent to the eastern boundary of the site.

3.6 Ground Conditions

The British Geological Survey (BGS) map indicates that no superficial deposits underlay the site. The bedrock underlying the site consists of the South Wales Middle Coal Measures Formation - mudstone, siltstone and sandstone.

4 Flood Risk

4.1 Sources of Flooding

All sources of flooding have been considered, these are; fluvial (river) flooding, tidal (coastal) flooding, groundwater flooding, surface water (pluvial) flooding, sewer flooding and flooding from artificial drainage systems/infrastructure failure.

4.2 Climate Change

Projections of future climate change, in the UK, indicate more frequent, short-duration, high intensity rainfall and more frequent periods of long duration rainfall. Guidance included within TAN15 recommends that the effects of climate change are incorporated into FCA. Recommended precautionary sensitivity ranges for peak rainfall intensities and peak river flows are outlined in the CL-03-16 - Climate change allowances for Planning purposes¹.

The 9th of January 2014 Welsh Government letter to all Chief Planning Officers (CPO) in Wales and CL-03-16 - Climate change allowances for Planning purposes clarifies and refers to the Natural Resources Wales recommendations that the lifetime of development for residential development is 100 years, and for other development it is considered to be 75 years.

Table 4-1 show the peak river flow allowances for this river basin district. There is reasonable level of certainty that the future impacts of climate change will lie somewhere between the central and upper allowances. Therefore, the design fluvial flood event for the site is the 1 in 100 year (+30%) event.

Table 4-1 Peak River Flow Allowances

River Basin District	Allowance Category	Total Potential Change Anticipated by the 2020s	Total Potential Change Anticipated by the 2050s	Total Potential Change Anticipated by the 2080s
Western Wales	Upper end estimate	25%	40%	75%
	Central estimate	15%	25%	30%
	Lower end estimate	5%	10%	15%

4.3 Historic Flooding

The Natural Resources Wales records show that the site has not historically flooded. The British Hydrological Society “Chronology of British Hydrological Event²” has no information on flooding within the vicinity of the site. No other historical records of flooding for the site

¹ <https://gov.wales/climate-change-allowances-and-flood-consequence-assessments>

² <http://www.dundee.ac.uk/geography/cbhe/>

have been recorded. Therefore, it has been concluded that the site has not historically flooded.

4.4 Existing and Planned Flood Defence Measures

There are no formal flood defences within this area.

4.5 Development Advice Map

The Development Advice Map (DAM) which accompanies TAN15 shows that the site is located within Zone A: Considered to be at little or no risk of fluvial or tidal/coastal flooding (see Figure 4-1). Used to indicate that justification test is not applicable and no need to consider flood risk further.

However, the area immediately adjacent to the east of the site is located within Zone C2: Areas of the floodplain without significant flood defence infrastructure. It should be noted that the proposed development will be located within Zone A with only the site access being located within Zone C2.

Table 4-2 describes the composition and use of the DAM zones to control and manage development.

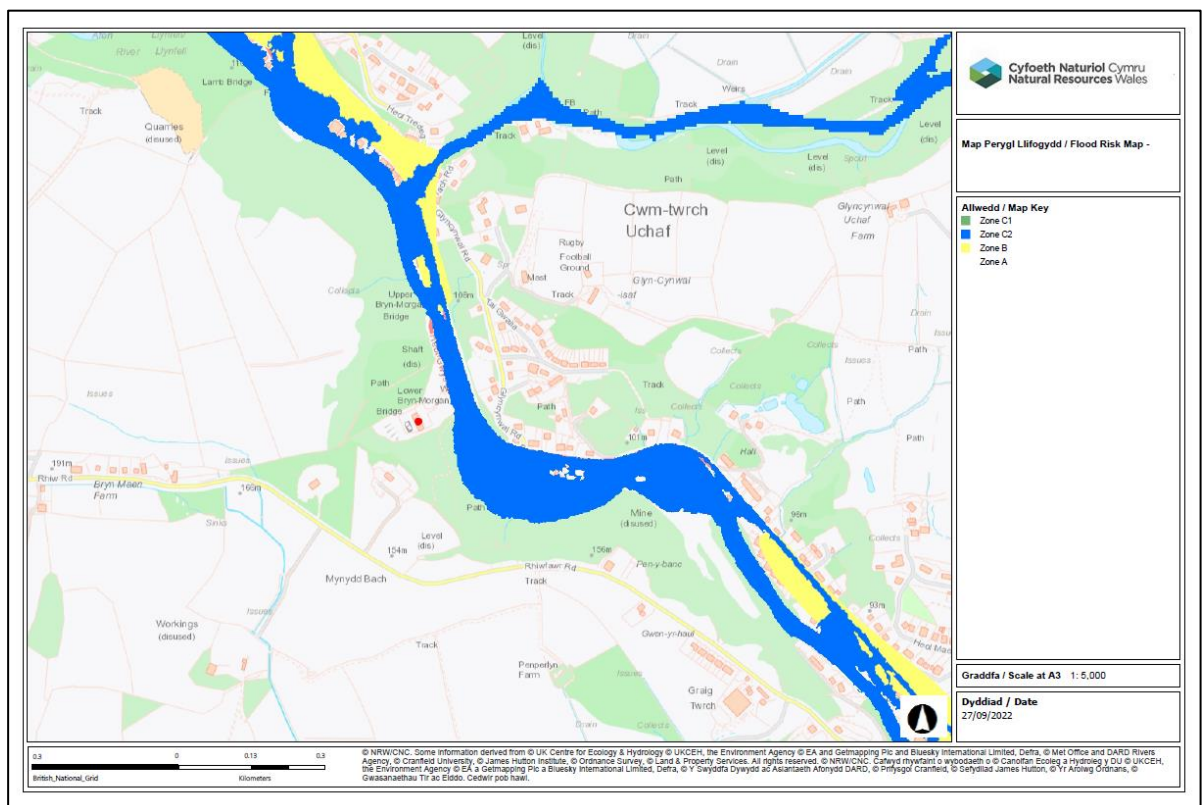


Figure 4-1 Development Advice Map

Table 4-2 Development Advice Map Zones

Description of Zone	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 Natural Resources Wales 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.

4.6 Flood Map for Planning

The Flood Map for Planning (FMfP) shows that the site is located within the following Flood Zones (see Figure 4-2):

- Rivers: Flood Zone 1
- Sea: Flood Zone 1
- Surface Water and Small Watercourses: Flood Zones 2 and 3

The area immediately adjacent to the east of the site is located within Flood Zone 2 and 3 for rivers. It should be noted that the proposed development will be located within Flood Zone 1 for rivers with only the site access being located within Flood Zones 2 and 3 for rivers.

The FMfP has no official status for planning purposes, however it is recommended by Natural Resources Wales that the 'best available information' on flood risk is used to inform planning decisions. Table 4-3 provides details of the FMfP Flood Zones.

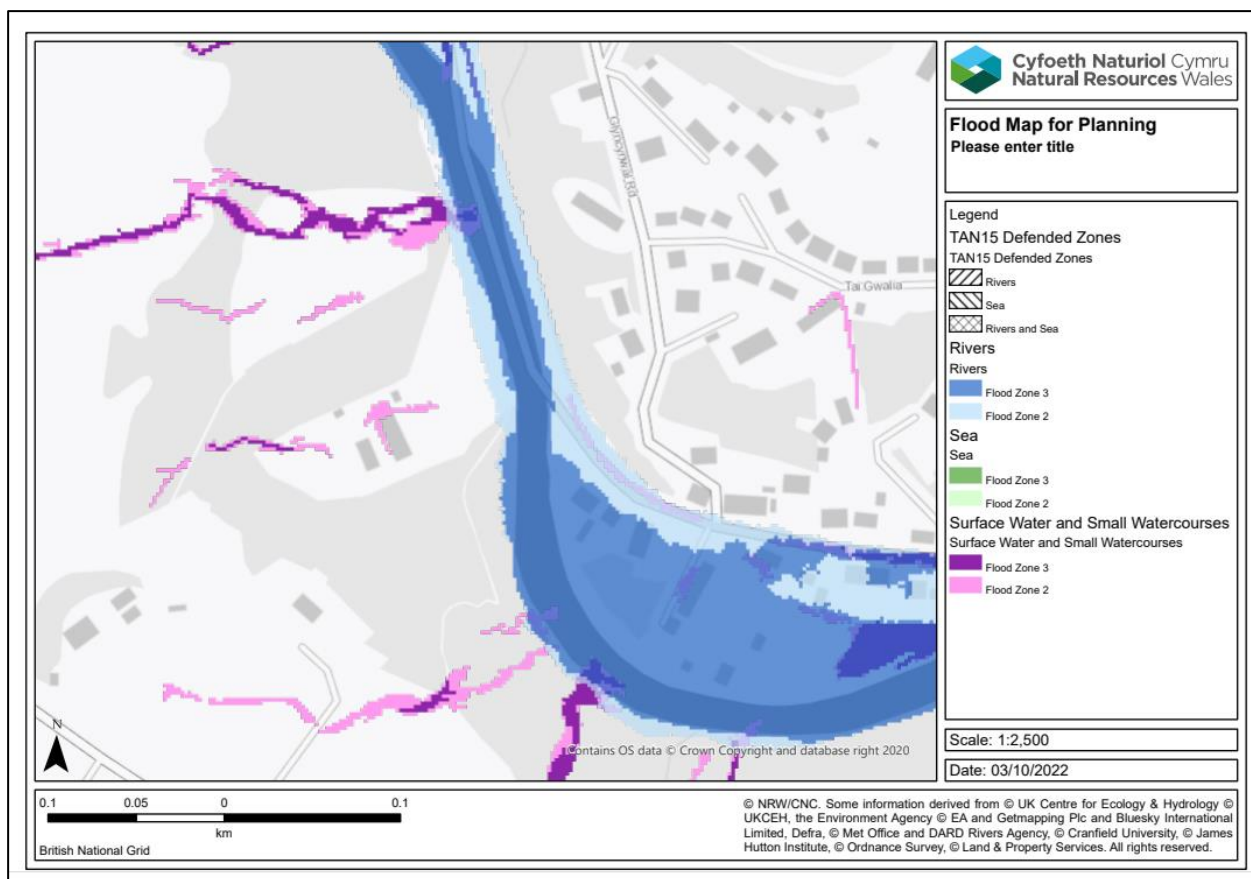


Figure 4-2 Flood Map for Planning

Table 4-3 Flood Map for Planning Flood Zones

Flood Zone	Explanation
Rivers - Flood Zone 2	Areas with 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from rivers in a given year, including the effects of climate change.
Rivers - Flood Zone 3	Areas with more than 1% (1 in 100) chance of flooding from rivers in a given year, including the effects of climate change.
Sea - Flood Zone 2	Areas with 0.1% to 0.5% (1 in 1000 to 1 in 200) chance of flooding from the sea in a given year, including the effects of climate change.
Sea - Flood Zone 3	Areas with more than 0.5% (1 in 200) chance of flooding from the sea in a given year, including the effects of climate change.
Surface Water and Small Watercourses - Flood Zone 2	Areas with 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change.
Surface Water and Small Watercourses - Flood Zone 3	Areas with more than 1% (1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change.

4.7 Flood Risk Vulnerability

Applying the Flood Risk Vulnerability Classification in Figure 2 of TAN15, the existing and proposed development is classified as being 'highly vulnerable'. The proposed development will not change the vulnerability of the site to flooding and will not result in a new 'highly vulnerable' use within the floodplain.

The proposed development will be located within Zone A and Flood Zone 1 with only the site access, which can be designated as 'less vulnerable', being located within Zone C2 and Flood Zones 2 and 3. The proposed development is appropriate at this location, as per TAN15.

4.8 Fluvial (river) Flooding

Due to the proximity of the site to the Afon Twrch, fluvial flooding from the Afon Twrch poses the primary flood risk to the site. Natural Resources Wales have provided results from the Cwm Twrch modelling^{3, 4}.

The Natural Resources Wales modelling shows that the site and the site access, including the two bridges over the Afon Twrch, will not be inundated with floodwater during the 1 in 100 year (+20%) event. The site and site access will be flood free for all events up to and including the 1 in 100 year (+20%) event, as shown in Figure 4-3. Furthermore, the site is also shown to not be inundated with floodwater during the 1 in 1000 year event, as shown in Figure 4-4. However, minor flooding of the A4068 - Heol Gwys road is shown to occur just to the east of the site during the 1 in 1000 year event.

During the 1 in 100 year (+20%) event the A4068 - Heol Gwys road to the east and north of the site is shown to have a low hazard rating of less than 0.75, as defined by SFRM2 and DEFRA guidelines⁵. The maximum hazard rating will be "low" which may result in a "flood zone with shallow flowing water or deep standing water". This will allow safe access and egress from the site during the 1 in 100 year (+20%) event.

The results from the 1 in 100 year (+30%) event has not been provided however, it can be inferred that due the small increase in flood outline from the 1 in 100 year (+20%) flood outline to the 1 in 1000 year flood outline, that the 1 in 100 year (+30%) will have a very similar flood outline and hazard rating to the 1 in 100 year (+20%) event. Therefore, it can be assumed that the site and site access will be flood free for all events up to and including the 1 in 100 year (+30%) event.

The site access and A4068 - Heol Gwys road is one of the last places in the area to flood and remains flood free when other areas are flooded. The site access is at such a ground level that it would only flood in the most extreme flood events; the site will remain flood free during the vast majority of flood events during the lifetime of the proposed development.

The site access is located where the onset of flooding is gradual as per Flood Risk Assessment Guidance for New Development Phase 2, R&D Technical Report FD2320/TR2. The typical rainfall profile for this region, in common with much of Mid-

³ Cwm Twrch 1D-2D Flood Hazard Modelling, Final Report, April 2013.

⁴ Hydraulic Model User Report: Cwm Twrch 1D-2D Flood Hazard Modelling, REVISED Final Report, April 2013.

⁵ DEFRA R&D Outputs (2006): Flood Risks to People Phase Two Draft FD2321/TR1 and TR2.

Wales, is a low intensity, long duration event commensurate with frontal weather systems. The speed of inundation and rate of floodwater rise would be low.

Given the scale and nature of the proposed development and the size and location of the fluvial flooding sources it has been concluded that fluvial flooding poses a low flood risk to the site access but not the site itself. Therefore, the risk of fluvial flooding is considered to be of **low significance**.

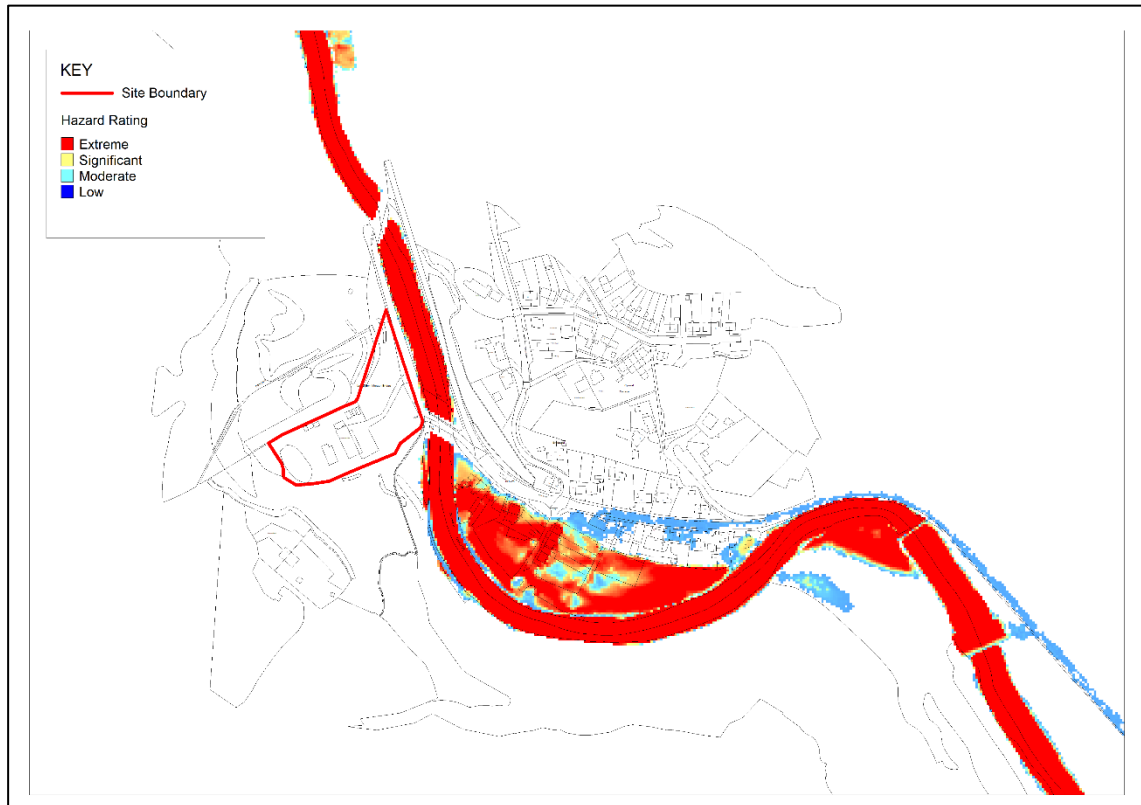


Figure 4-3 Hazard Rating: 1 in 100 (+20%) Year Event

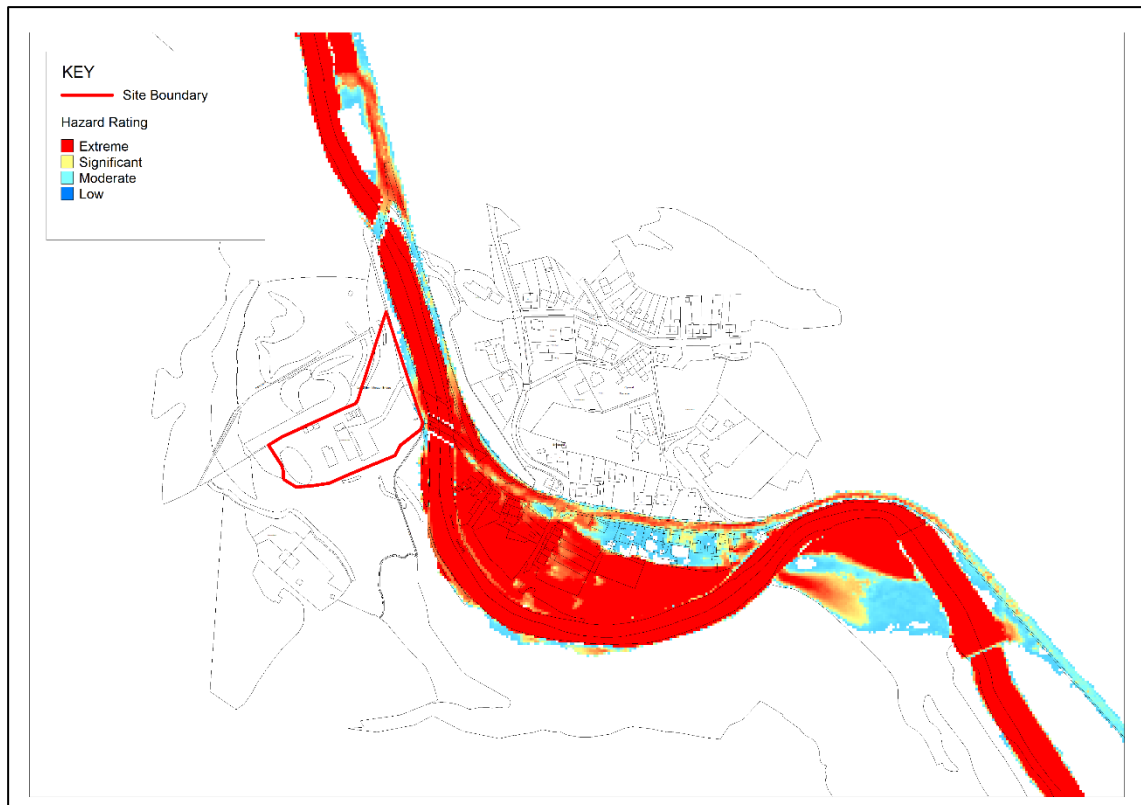


Figure 4-4 Hazard Rating: 1 in 1000 Year Event

4.9 Tidal (coastal) Flooding

The site is not located within the vicinity of tidal flooding sources and the risk of tidal flooding is considered to be **not significant**.

4.10 Groundwater Flooding

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

Groundwater flooding tends to occur sporadically in both location and time. When groundwater flooding does occur, it tends to mostly affect low-lying areas, below surface infrastructure and buildings (for example, tunnels, basements and car parks) underlain by permeable rocks (aquifers).

Given the nature of the soils in the area and the lack of historical data on groundwater flooding within this area there is a very low risk of groundwater flooding. Also no below surface infrastructure and buildings are located or are proposed for the site. Therefore, the risk of flooding from groundwater flooding is considered to be **not significant**.

4.11 Surface Water (pluvial) Flooding

Surface water flooding tends to occur sporadically in both location and time such surface water. The site is not situated on and adjacent to areas of permeability and areas with geology which may result in surface water flooding.

The majority of the site is located within Flood Zone 1 and has a chance of flooding of less than 1 in 1000 (0.1%) years, including the effects of climate change (see Figure 4-2). However, the north east of the site is located within Flood Zones 2 and 3 for flooding from surface water and small watercourses. Flood Zone 2 has a 1 in 100 (1%) to 1 in 1000 (0.1%) year chance of flooding in a given year, including the effects of climate change. Flood Zone 3 has greater than a 1 in 100 (1%) year chance of flooding in a given year, including the effects of climate change.

This would result in very low water depths, water velocities and therefore low flood risk to the site. Therefore, the risk of flooding from surface water flooding is considered to be of **low significance**.

4.12 Sewer Flooding

Sewer flooding occurs when urban drainage networks become overwhelmed and maximum capacity is reached. This can occur if there is a blockage in the network causing water to back up behind it or if the sheer volume of water draining into the system is too great to be handled. Sewer flooding tends to occur sporadically in both location and time such flood flows would tend to be confined to the streets around the development.

Any existing sewers located within the vicinity of the will inevitably have a limited capacity so in extreme conditions there would be surcharges, which may in turn cause flooding. Flood flows could also be generated by burst water mains but these would tend to be of a restricted and much lower volume than weather generated events and so can be discounted for the purposes of this assessment.

Given the design parameters normally used for drainage design in recent times and allowing for some deterioration in the performance of the installed systems, which are likely to have been in place for many years, an appropriate flood risk probability from this source could be assumed to have a return period in the order of 1 in 10 to 1 in 20 years.

The provision of adequate level difference between the ground levels and the invert levels of sewers would reduce the annual probability from this source to 1 in 100 years or less. The risk of flooding from sewer flooding is considered to be **not significant**.

4.13 Flooding from Artificial Drainage Systems/Infrastructure Failure

The Natural Resources Wales Reservoir flood map shows that the site is not at risk of reservoir flooding (see Figure 4-5). The risk of flooding from flooding from artificial drainage systems/infrastructure failure is considered to be **not significant**.

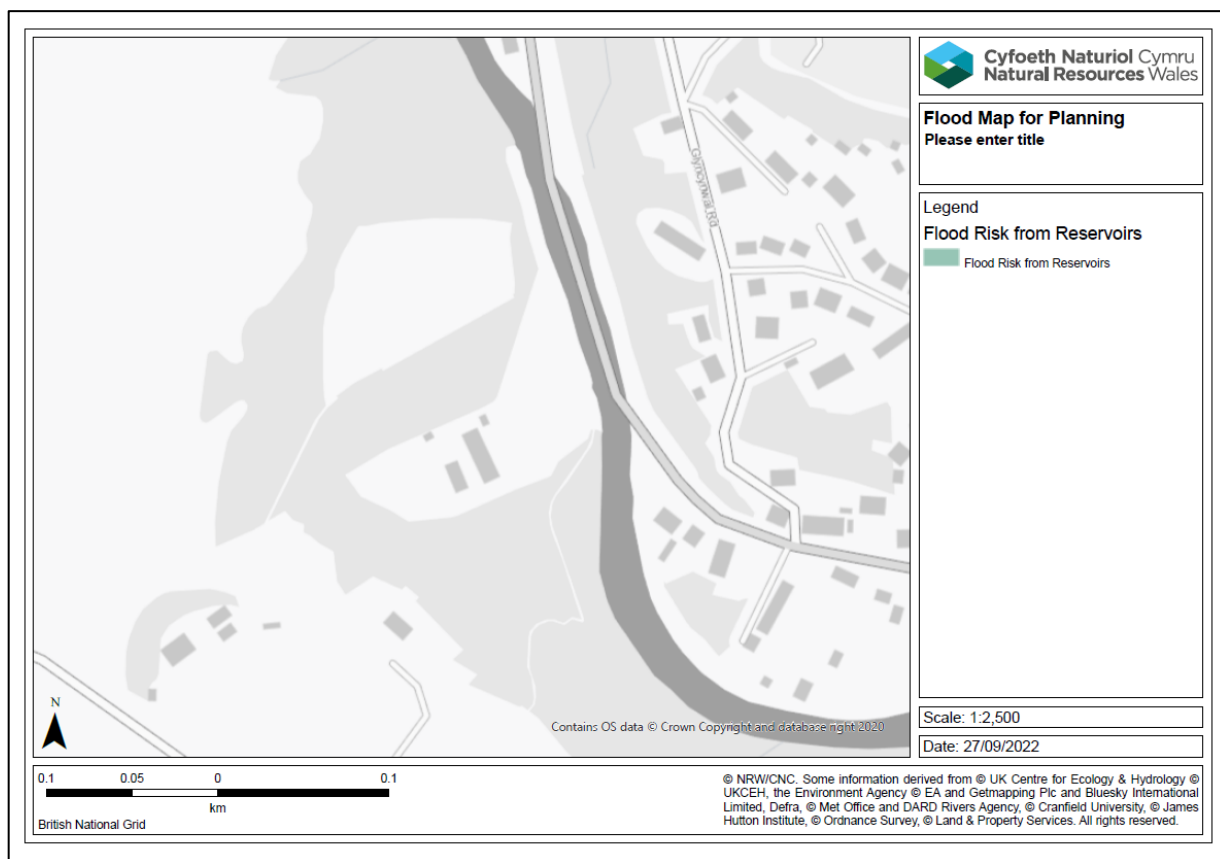


Figure 4-5 Natural Resources Wales Reservoir Flood Map

4.14 Effect of the Development on Flood Risk

The proposed development will have no impact on flood risk and the overall direction of the movement of water will be maintained within the developed site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed. The site proposals have been shown to be in accordance with A1.12 of TAN15.

4.15 Summary of Site Specific Flood Risk

A summary of the sources of flooding and a review of the risk posed by each source at the site is shown in Table 4-4.

Due to the proximity of the site to the Afon Twrch, fluvial flooding from the Afon Twrch poses the primary flood risk to the site. The DAM shows that the site is located within Zone A: Considered to be at little or no risk of fluvial or tidal/coastal flooding. Used to indicate that justification test is not applicable and no need to consider flood risk further. However, the area immediately adjacent to the east of the site is located within Zone C2: Areas of the floodplain without significant flood defence infrastructure.

The FMfP shows that the site is located within the following, Flood Zone 1 for rivers and sea and Flood Zones 2 and 3 for surface water and small watercourses. The area immediately adjacent to the east of the site is located within Flood Zone 2 and 3 for rivers. It should be noted that the proposed development will be located within Zone A and Flood Zone 1 for rivers with only the site access being located Zone C2, Flood Zones 2 and 3 for rivers.

The existing and proposed development is classified as being 'highly vulnerable'. The proposed development will not change the vulnerability of the site to flooding and will not result in a new 'highly vulnerable' use within the floodplain.

The proposed development will be located within Zone A and Flood Zone 1 with only the site access, which can be designated as 'less vulnerable', being located within Zone C2 and Flood Zones 2 and 3 for rivers. The proposed development is appropriate at this location, as per TAN15.

Natural Resources Wales modelling shows that the site and the site access, including the two bridges over the Afon Twrch, will not be inundated with floodwater during the 1 in 100 year (+20%) event. The site and site access will be flood free for all events up to and including the 1 in 100 year (+20%) event,. Furthermore, the site is also shown to not be inundated with floodwater during the 1 in 1000 year event. However, minor flooding of the A4068 - Heol Gwys road is shown to occur just to the east of the site during the 1 in 1000 year event.

During the 1 in 100 year (+20%) event the A4068 - Heol Gwys road to the east and north of the site is shown to have a low hazard rating of less than 0.75,. The maximum hazard rating will be "low" which may result in a "flood zone with shallow flowing water or deep standing water". This will allow safe access and egress from the site during the 1 in 100 year (+20%) event.

It can be inferred that due the small increase in flood outline from the 1 in 100 year (+20%) flood outline to the 1 in 1000 year flood outline, that the 1 in 100 year (+30%) will have a very similar flood outline and hazard rating to the 1 in 100 year (+20%) event. Therefore, it can be assumed that the site and site entrance will be flood free for all events up to and including the 1 in 100 year (+30%) event.

The site access and A4068 - Heol Gwys road is one of the last places in the area to flood and remains flood free when other areas are flooded. The site access is at such a ground level that it would only flood in the most extreme flood events; the site will remain flood free during the vast majority of flood events during the lifetime of the proposed development.

Given the scale and nature of the proposed development and the size and location of the fluvial flooding sources it has been concluded that fluvial flooding poses a low flood risk to the site access but not the site itself. Therefore, the risk of fluvial flooding is considered to be of **low significance**. A secondary flooding source has been identified which may pose a **low significant** risk to the site. This is surface water (pluvial) flooding.

The proposed development will have no impact on flood risk and the overall direction of the movement of water will be maintained within the developed site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed. The site proposals have been shown to be in accordance with A1.12 of TAN15.

The risk of flooding will be further managed and mitigated by using a number of mitigation measures to manage and reduce the overall flood risk at the site (see Section 5.0).

Table 4-4 Risk Posed by Flooding Sources.

Sources of Flooding	Potential Flood Risk	Potential Source	Probability/Significance
Fluvial (river) Flooding	Yes	Afon Twrch	Low
Tidal (coastal) Flooding	No	None Reported	Not significant
Groundwater Flooding	No	None Reported	Not significant
Surface Water (pluvial) Flooding	Yes	Poor Permeability	Low
Sewer Flooding	No	None Reported	Not significant
Flooding from Artificial Drainage Systems/Infrastructure Failure	No	None Reported	Not significant

5 Risk Management

5.1 Introduction

In this flood zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development and the use of flood mitigation measures.

A number of techniques and mitigation strategies to manage and reduce the overall flood risk in the area will be used. This will ensure the development will be safe and there is:

- Minimal risk to life;
- Minimal disruption to people living and working in the area;
- Minimal potential damage to property;
- Minimal impact of the proposed development on flood risk generally; and;
- Minimal disruption to natural heritage.

5.2 Safe Access and Egress Routes

Results from Natural Resources Wales modelling shows that the site and the site access, including the two bridges over the Afon Twrch, will not be inundated with floodwater during the 1 in 100 year (+20%) event. The site and site entrance will be flood free for all events up to and including the 1 in 100 year (+20%) event.

During the 1 in 100 year (+20%) event the A4068 - Heol Gwys road to the east and north of the site is shown to have a low hazard rating of less than 0.75, as defined by SFRM2 and DEFRA guidelines. The maximum hazard rating will be "low" which may result in a "flood zone with shallow flowing water or deep standing water". This will allow safe access and egress from the site during the 1 in 100 year (+20%) event.

The results from the 1 in 100 year (+30%) event has not been provided however, it can be inferred that due the small increase in flood outline from the 1 in 100 year (+20%) flood outline to the 1 in 1000 year flood outline that the 1 in 100 year (+30%) will have a very similar flood outline to the 1 in 100 year (+20%) flood outline with limited water depths, velocities and hazard rating. Therefore, it can be assumed that the site and site access will be flood free for all events up to and including the 1 in 100 year (+30%) event.

The site access and A4068 - Heol Gwys road is one of the last places in the area to flood and remains flood free when other areas are flooded. The site access is at such a ground level that it would only flood in the most extreme flood events; the site will remain flood free during the vast majority of flood events during the lifetime of the proposed development.

Access routes should be such that occupants can safely access and exit their buildings in design flood conditions. These routes must also provide the emergency services with access to the development during a flood event and enable flood defence authorities to carry out any necessary duties during the period of flood. A safe access and egress route, including emergency access, has been identified by foot/vehicles via:

- **Main Access Route:** By the site access to the east, then via the A4068 - Heol Gwys road to the east and/or north, by vehicle or by foot. Low water depths, velocities and hazard ratings will be experienced.

The Safe Access and Egress Route shown in Figure 5-1 indicates the exit route that all people (i.e. occupants and visitors) on site should follow once a flood warning has been received. People should make their way to areas outside of the flood zone.

Given that the site is located within a flood warning area, site users will be made aware of the flood risk and should have more than sufficient time to evacuate the site before flooding of the access road would be expected. Therefore, the lead time of the flooding will provide site users with more than ample time to evacuate the site and seek safe refuge outside the floodplain. In the event of a flood warning, vital belongings, including waterproof clothing, necessary medication and essentials for infants and children will be collected. It should be ensured that all occupiers and visitors to the site are accounted for, and then exit the site.

The likelihood of a rapid water level rise and possible rapid inundation posing a risk to life is considered to be minimal with a forewarning of two (2) days of a pending flood event. The site is located within a low risk area where the onset of flooding is very gradual (many hours) as per Flood Risk Assessment Guidance for New Development Phase 2, R&D Technical Report FD2320/TR2.

In the event of a flood warning, vital belongings, including waterproof clothing, necessary medication will be collected. It should be ensured that all occupiers and visitors to the site are accounted for, and then exit the site. The above factors would, therefore, allow safe access and egress as per TAN15 and Natural Resources Wales guidance.

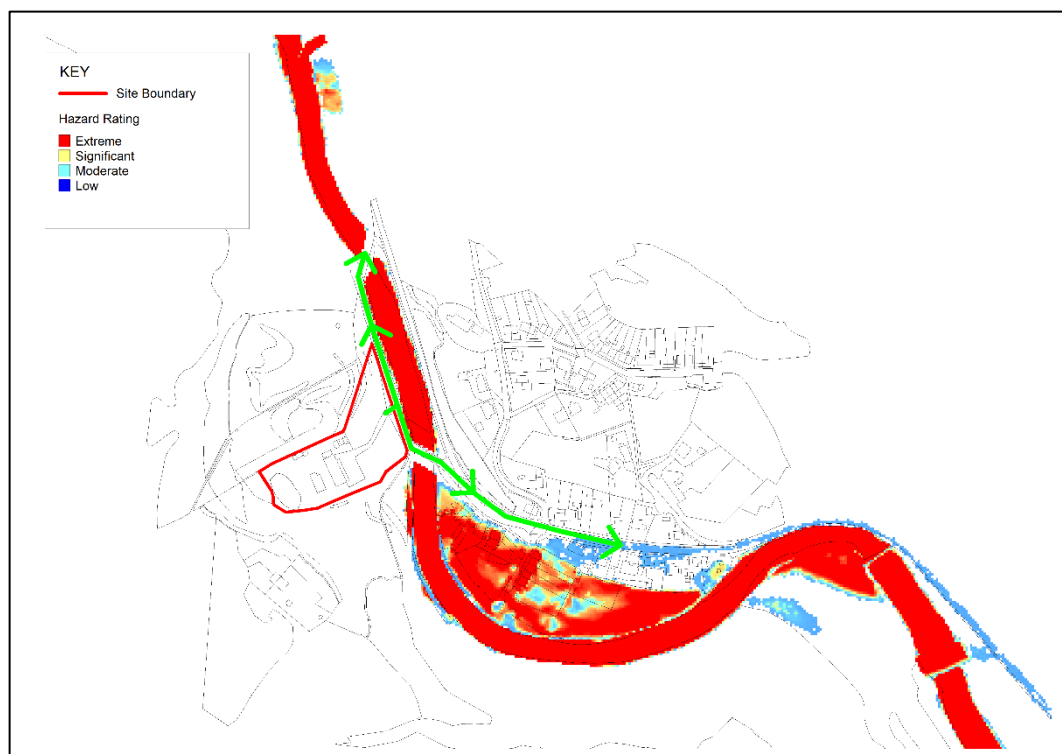


Figure 5-1 Safe Access and Egress Routes

5.3 Flood Warning and Evacuation Plan

A Flood Warning and Evacuation Plan (FWEP) outlining the precautions and actions you should take when a flood event is anticipated to help reduce the impact and damage flooding may cause will be developed and will be made available to occupants/visitors of the site and will include the Safe Access and Egress Routes.

Sensible precautions would include raising electrical items, irreplaceable items and sentimental items off the ground or where possible moving them to a higher floor, rolling up carpets and rugs and turning off utilities. In addition, consider what actions you would take should the property need to be evacuated including access and egress routes and preparing a flood kit in advance containing warm clothing, medication, a torch, food and wellingtons.

The FWEP is a 'living' document and therefore should be periodically reviewed and updated to provide advice and guidance to occupants in the event of an extreme flood. The FWEP will therefore reduce the vulnerability of the occupants to flooding and makes them aware of the mechanisms of flooding at the site. The flood levels will be monitored and the occupants/visitors informed when the FWEP is to be initiated.

5.4 Evacuation Procedure

Occupants and visitors should initially undertake a visual check to ensure that no floodwater is present within the access lane and road prior to evacuation. If the visual check determines that the floodwater is yet to reach access lane and road, occupiers and visitors should exit via the main access to the site. Occupants and visitors should proceed swiftly but calmly. Occupiers and visitors should not take from the site any bulky items that may impede their evacuation. Occupiers and visitors should provide assistance to those who may need it, such as children, the elderly or disabled.

The emergency services should be contacted if floodwater has reach the site entrance and the occupants are unable to evacuate the site. As this point they should consider safe refuge, as detailed below.

It should be ensured that all occupiers and visitors to the site are accounted for, and then exit the site using the Safe Access and Egress Routes shown in Figure 5-1. Vital belongings, including waterproof clothing, necessary medication and essentials for infants and children will be collected.

If occupants are going to be evacuated to an off-site place of refuge via the Safe Access and Egress Routes, an easily accessible "grab-bag" / flood Kit will be prepared and kept in a safe and dry place. The kit should include:

- Torch (windup or spare batteries)
- Blankets
- Waterproof clothing
- Wellington boots
- Water
- Non-perishable food
- Portable radio (windup or spare batteries)
- Rubber gloves

- First aid kit
- Mobile phone
- A copy of the FWEP

5.5 Safe Refuge Area

In the event that evacuation of the site is not possible, due to flooding of the access and egress routes, then safe refuge is possible within the site. The site is not located within the floodplain and therefore, will be flood free. This will provide a 'safe haven' should flooding occur which is unlikely. The 'safe haven' will only be required in very extreme events or if a flood warning has not been received.

5.6 Residual Risk

The proposed development of the site can be justified in accordance with TAN15 as it can be demonstrated that the consequences of flooding can be managed down to a level which is acceptable for the nature and type of site. The mitigation measures detailed above show that the flood risk can be effectively managed and therefore the consequences of flooding are acceptable. As such, the residual risk is considered to be acceptable for the lifetime of the development.

6 Justifying the Location of the Development

6.1 Justification Test

The Justification Test sets out the details required to justify siting a new development in an area believed to be at risk of flooding and is defined in Section 6 of TAN15. The required criteria a site / development must fulfil are:

- i) its location in zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; or
- ii) its location in zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;

and

- iii) it concurs with the aims of PPW and meets the definition of previously developed land; and,
- iv) the potential consequences of a flooding event for the particular type of development have been considered, and in terms of the criteria contained in sections 5 and 7 and appendix 1 found to be acceptable.

The proposed development has been assessed against the requirements of the Justification Test.

The site is located within Zone A with only the site access being located within Zone C2. The site has been designated as suitable in size and location to accommodate the proposed development.

The proposals are for the conversion of the outbuildings to form ancillary self-contained units to increase the number of young people from 4 to 8. The proposed development will provide an improved accommodation compared to the existing situation and will help encourage economic impetus that will in turn help deliver a stronger service function and mix of residential uses.

The site proposals remain consistent with the relevant planning policies and are not at odds with the current use of the site and can only enhance and preserve the situation which currently exists.

The potential consequences of a flooding event for the particular type of development have been considered within this FCA. This FCA details the potential consequences of flooding from all sources taking into account the proposed development type has been considered and has been found to be acceptable. The development proposals should be considered by the LPA to satisfy the Justification Test as set out in TAN15.

6.2 Assessment of Acceptability Criteria

New development should be directed away from Zone C and towards suitable land in Zone A, otherwise to Zone B, where river or coastal flooding will be less of an issue. However,

in some areas where developable land is in short supply, there can be an overriding need to build in areas that are at risk of flooding.

There is an indicative frequency threshold of flooding below which flooding of developed may not be allowed (see Table A1.14 of TAN15) and flood consequences during an extreme flood (see Table A1.15 of TAN15).

The probability of flooding to a depth of 600mm or more is greater than 1 in 1000 years. The data for the 1 in 1000 year (plus climate change) events is not available. The typical rainfall profile for this region, in common with much of Mid-Wales, is a low intensity, long duration event commensurate with frontal weather systems. The speed of inundation and rate of floodwater rise would be low.

The consequences of flooding can be acceptably managed for the lifetime of the development recognising the small scale proposal on the edge of floodplain. Planning Appeal Reference: APP/G6935/A/20/3258002 confirms that these should only be taken as indicative and are not prescriptive.

The site can be justified in accordance with TAN15 as it can be demonstrated that the consequences of flooding can be managed down to a level which is acceptable for the nature and type of site. The mitigation measures detailed above show that the flood risk can be effectively managed and therefore the consequences of flooding are acceptable.

Therefore, the site is compliant with Tables A1.14 and A1.15 of TAN15. The development proposals should therefore be considered by the LPA to satisfy the Acceptability Criteria as set out in TAN15.

7 Summary and Conclusions

7.1 Introduction

This report presents an FCA in accordance with TAN15 for the proposed development at Brynmorgan Villa, Upper Cwmtwrch, SA9 2XG.

7.2 Flood Risk

Due to the proximity of the site to the Afon Twrch, fluvial flooding from the Afon Twrch poses the primary flood risk to the site. The DAM shows that the site is located within Zone A: Considered to be at little or no risk of fluvial or tidal/coastal flooding. Used to indicate that justification test is not applicable and no need to consider flood risk further. However, the area immediately adjacent to the east of the site is located within Zone C2: Areas of the floodplain without significant flood defence infrastructure.

The FMfP shows that the site is located within the following, Flood Zone 1 for rivers and sea and Flood Zones 2 and 3 for surface water and small watercourses. The area immediately adjacent to the east of the site is located within Flood Zone 2 and 3 for rivers. It should be noted that the proposed development will be located within Zone A and Flood Zone 1 for rivers with only the site access being located Zone C2, Flood Zones 2 and 3 for rivers.

The existing and proposed development is classified as being 'highly vulnerable'. The proposed development will not change the vulnerability of the site to flooding and will not result in a new 'highly vulnerable' use within the floodplain.

The proposed development will be located within Zone A and Flood Zone 1 with only the site access, which can be designated as 'less vulnerable', being located within Zone C2 and Flood Zones 2 and 3 for rivers. The proposed development is appropriate at this location, as per TAN15.

Natural Resources Wales modelling shows that the site and the site access, including the two bridges over the Afon Twrch, will not be inundated with floodwater during the 1 in 100 year (+20%) event. The site and site access will be flood free for all events up to and including the 1 in 100 year (+20%) event,. Furthermore, the site is also shown to not be inundated with floodwater during the 1 in 1000 year event. However, minor flooding of the A4068 - Heol Gwys road is shown to occur just to the east of the site during the 1 in 1000 year event.

During the 1 in 100 year (+20%) event the A4068 - Heol Gwys road to the east and north of the site is shown to have a low hazard rating of less than 0.75,. The maximum hazard rating will be "low" which may result in a "flood zone with shallow flowing water or deep standing water". This will allow safe access and egress from the site during the 1 in 100 year (+20%) event.

It can be inferred that due the small increase in flood outline from the 1 in 100 year (+20%) flood outline to the 1 in 1000 year flood outline, that the 1 in 100 year (+30%) will have a very similar flood outline and hazard rating to the 1 in 100 year (+20%) event. Therefore, it can be assumed that the site and site access will be flood free for all events up to and including the 1 in 100 year (+30%) event.

The site access and A4068 - Heol Gwys road is one of the last places in the area to flood and remains flood free when other areas are flooded. The site access is at such a ground level that it would only flood in the most extreme flood events; the site will remain flood free during the vast majority of flood events during the lifetime of the proposed development.

Given the scale and nature of the proposed development and the size and location of the fluvial flooding sources it has been concluded that fluvial flooding poses a low flood risk to the site access but not the site itself. Therefore, the risk of fluvial flooding is considered to be of **low significance**. A secondary flooding source has been identified which may pose a **low significant** risk to the site. This is surface water (pluvial) flooding.

The proposed development will have no impact on flood risk and the overall direction of the movement of water will be maintained within the developed site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed. The site proposals have been shown to be in accordance with A1.12 of TAN15.

The risk of flooding will be further managed and mitigated by using a number of mitigation measures to manage and reduce the overall flood risk at the site.

7.3 Risk Management

The flood risk at the site will be reduced by the following risk management measures:

Safe Access and Egress Routes: The site and site entrance will be flood free for all events up to and including the 1 in 100 year (+20%) event. During the 1 in 100 year (+20%) event the A4068 - Heol Gwys road to the east and north of the site is shown to have a low hazard rating of less than 0.75, as defined by SFRM2 and DEFRA guidelines. The maximum hazard rating will be "low" which may result in a "flood zone with shallow flowing water or deep standing water". This will allow safe access and egress from the site during the 1 in 100 year (+20%) event.

The results from the 1 in 100 year (+30%) event has not been provided however, it can be assumed that due the small increase in flood outline from the 1 in 100 year (+20%) flood outline to the 1 in 1000 year flood outline that the 1 in 100 year (+30%) will have a very similar flood outline to the 1 in 100 year (+20%) flood outline. Therefore, it can be assumed that the site and site entrance will be flood free for all events up to and including the 1 in 100 year (+30%) event.

The site access and A4068 - Heol Gwys road is one of the last places in the area to flood and remains flood free when other areas are flooded.

A safe access and egress route, including emergency access, has been identified by foot/vehicles via:

- **Main Access Route:** By the site access to the east, then via the A4068 - Heol Gwys road to the east and north, by vehicle or by foot. Low water depths and velocities may be experienced.

Therefore, safe access and egress as per TAN15 and Natural Resources Wales guidance will be possible from the site.

Flood Warning and Evacuation Plan: A FWEP outlining the precautions and actions you should take when a flood event is anticipated to help reduce the impact and damage flooding may cause will be developed and will be made available to occupants/visitors of the site and will include the Safe Access and Egress Routes.

Evacuation Procedure: Occupants and visitors should initially undertake a visual check to ensure that no floodwater is present within the access lane and road prior to evacuation. If the visual check determines that the floodwater is yet to reach access lane and road, occupiers and visitors should exit via the main access to the site. Occupants and visitors should proceed swiftly but calmly. Occupiers and visitors should not take from the site any bulky items that may impede their evacuation. Occupiers and visitors should provide assistance to those who may need it, such as children, the elderly or disabled.

Safe Refuge Area: In the event that evacuation of the site is not possible, due to flooding of the access and egress routes, then safe refuge is possible within the site. The site is not located within the floodplain and therefore, will be flood free. This will provide a 'safe haven' should flooding occur which is unlikely. The 'safe haven' will only be required in very extreme events or if a flood warning has not been received.

7.4 Justifying the Location of the Development

The development proposals should be considered by the LPA to satisfy the Justification Test and the Acceptability Criteria as set out in TAN15.

7.5 Conclusion

In conclusion, the proposed development would be expected to remain dry in all but the most extreme conditions. The proposed development will provide betterment compared to the existing situation.

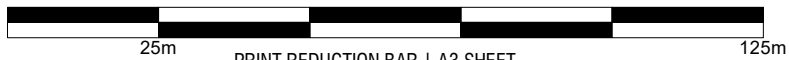
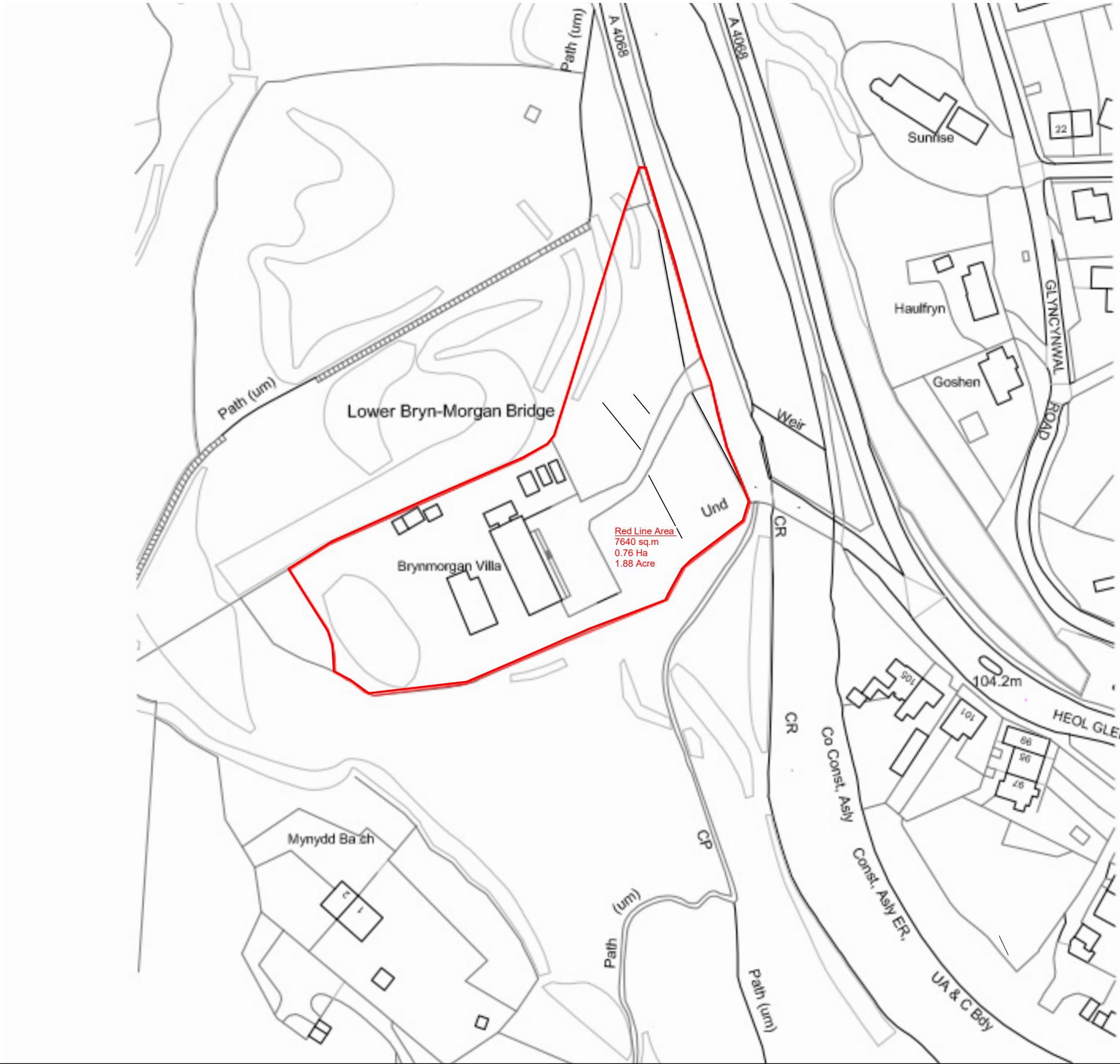
Providing the recommendations made in this FCA are instigated, flood risk from all sources would be minimised, the consequences of flooding are acceptable, and the development would be in accordance with the requirements of TAN15.

This FCA demonstrates that the proposed development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of TAN15. The development should not therefore be precluded on the grounds of flood risk.

Appendices

Appendix 1

Existing and Proposed Site Layout



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SA31 3DQ

Rev.	AMENDMENT	DATE

BRYNMORGAN VILLA OS MAP

SCALE: 1 : 1250

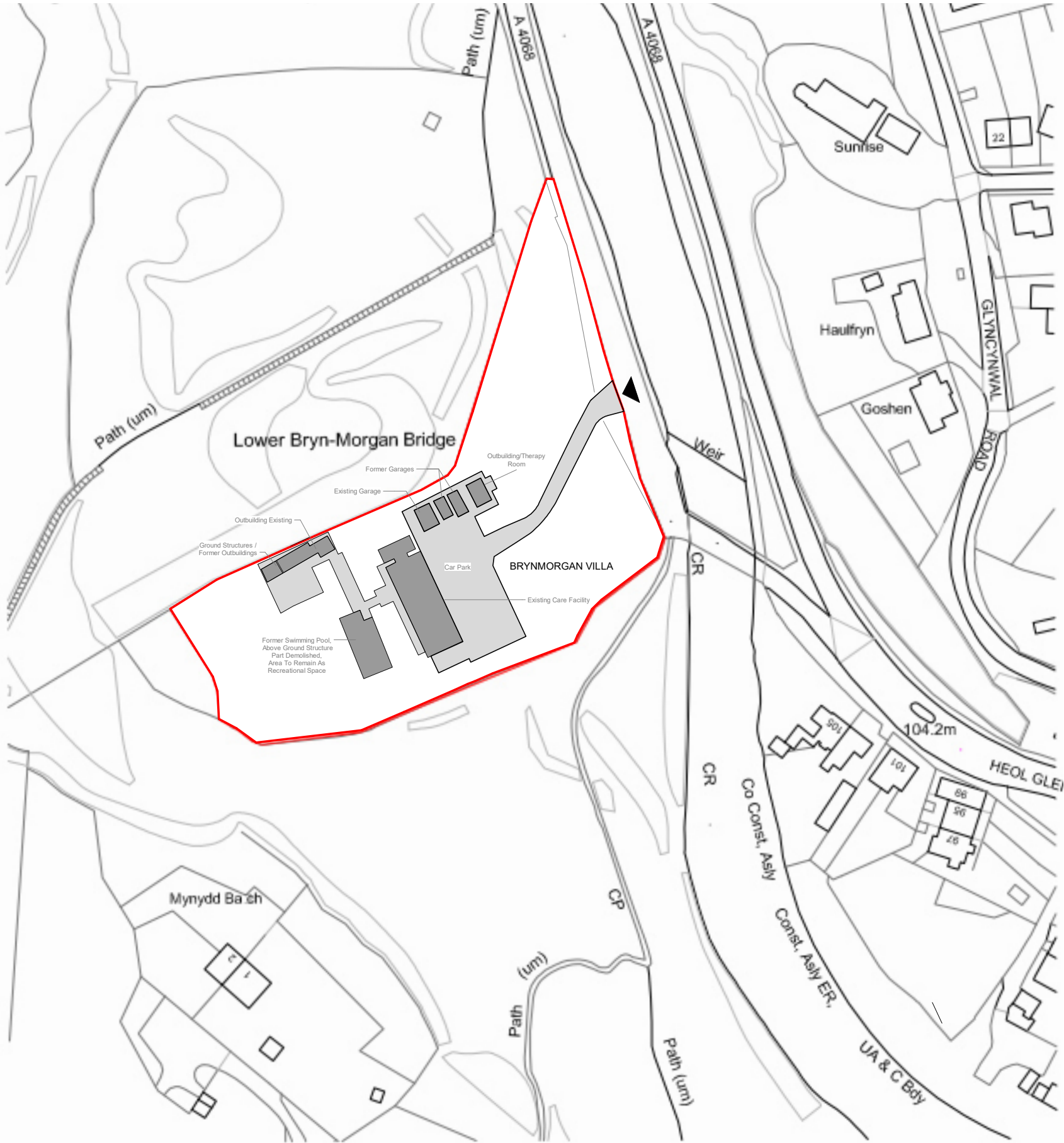
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JOB / DRAWING No.

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REVISION

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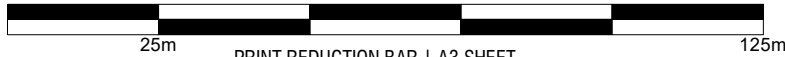
EXISTING AREAS (APROX):

Site Area
7640 sq.m
0.76 Ha
1.88 Acre

Existing / Former Buildings
720 sq.m

Hard Standing
1290 sq.m

Soft Landscaping
5,630 sq.m



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Dyfed
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Rev.	AMENDMENT	DATE

BRYNMORGAN VILLA
EXISTING AREAS

SCALE: 1 : 1250

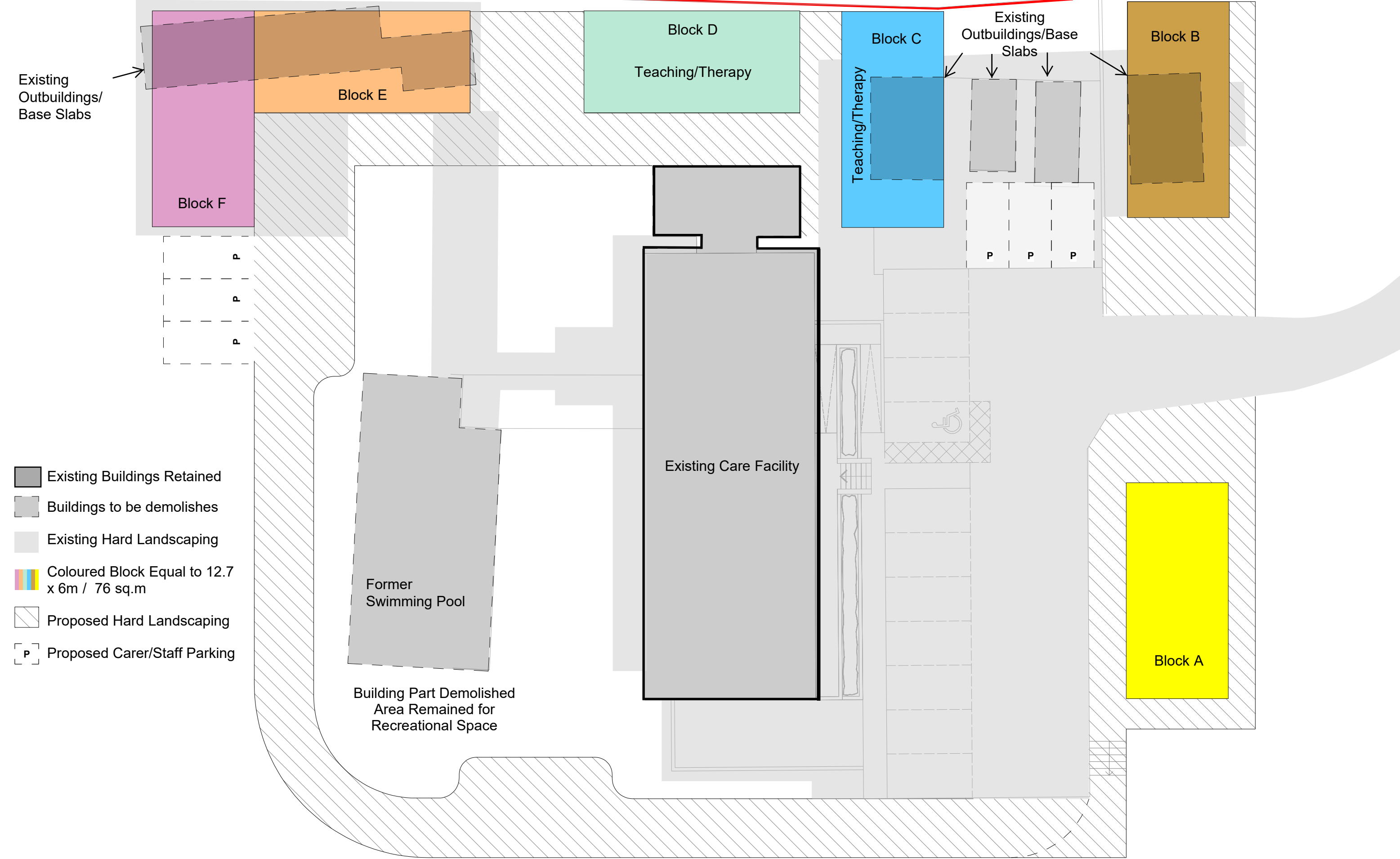
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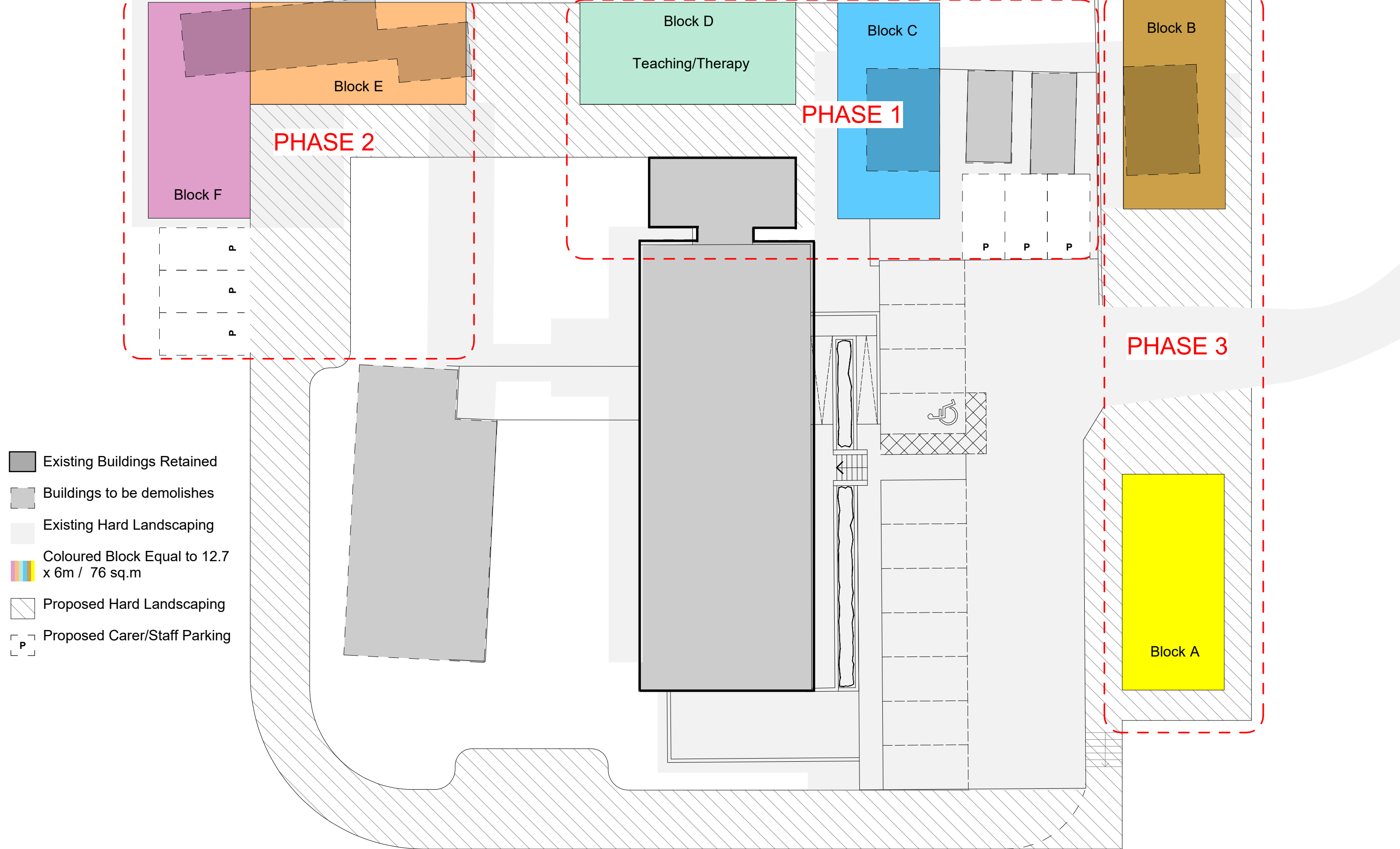
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REVISION

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- Existing Buildings Retained
- Buildings to be demolishes
- Existing Hard Landscaping
- Coloured Block Equal to 12.7 x 6m / 76 sq.m
- Proposed Hard Landscaping
- Proposed Carer/Staff Parking