

Drainage Strategy Report (DSR) For:
Development at Baglan Boxing Club,
Fenbrook Close,
Port Talbot,
SA12 7PA

Prepared for:

Baglan Boxing Club

REF: 10986-DSR

DATE: January 2023

Document Control

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Client	Baglan Boxing Club
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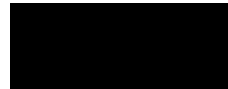
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1 INTRODUCTION

1.1 Site Location

Vale Consultancy has been instructed by Mr Malcolm Emerson of Baglan Bulldogs Boxing (*The Client*) to undertake a drainage strategy report (DSR) for the proposed development at Fenbrook Close, Port Talbot, SA12 7PA (274642E, 191961N).

The site currently comprises the existing building which has a footprint of approximately **500m²** along with associated access and parking. The frontage (north) of the site is made up of an expansive soft landscaped verge. The total site area as defined by the site boundary is approximately **3,261m²** or **0.32ha**. Refer to **Appendix A - Existing Site Plans**.

The site is located in the town of Baglan which is approximately 4km north-west from Port Talbot and inland from Swansea Bay. The M4 is located approximately 160m north-east from the site, with the National Rail Network line further afield which runs parallel to the motorway.

The site is bounded by Fenbrook Close to the north, Port Talbot Cricket Club to the east, Baglan Way Road to the south, and a soft landscaped verge and roundabout to the west. Fenbrook Close provides access to the site. The wider surrounding land use area comprises a mix of residential and industrial buildings along with some parcels of vacant, undeveloped land.

The proposed development site is within the constraints of the existing building and surrounding developed land and is therefore classified as **Brownfield**. The following DSR will cover the hydraulic design criteria of the surface water drainage network only.



Figure 1: Site Location Satellite Plan

1.2 Proposed Development

The proposal is for three separate extensions to the existing building and construction of new, additional access and parking facilities in the north extent of the site. The proposed extensions will result in an additional **122m²** giving the building a footprint of approximately **590m²**. The proposed new hardstanding access and parking facilities is approximately **208m²**. The two smaller extensions situated on the north-eastern face of the existing building are proposed as two meeting rooms and a smaller utility room. The larger extension on the 'new front' of the building will be comprised of a reception area, office, and kitchen/lounge. The total area enclosed in the site boundary is approximately **0.32ha**. However, the area comprised within the SAB boundary, representing the new construction area is only **760m²**. Refer to **Appendix B - Proposed Site Plans**.

1.3 Existing Geology

Infiltration testing was undertaken by Vale Consultancy on the 26th October 2022. One trial pit was undertaken to investigate the sites existing ground conditions and also undertake infiltration testing. In summary, the ground was made up of rooted loamy sand up to 0.1m in depth, followed by 0.1-1.0m of sandy gravel.

In order to carry out the infiltration testing a 1.5T mini digger was utilised to dig the trial pit to the dimensions of 0.8m long X 0.4m wide X 1.0m deep. In turn, the pit was filled rapidly to a sufficient depth in order to prevent copious amounts of infiltration occurring prior to the test beginning. A measuring staff was then utilised to determine when the pit had drained from 75% to 25%. Images of the trial pit both before and during testing can be seen in **Figure(s) 2 & 3** below.



Figures 2: Trial Pit Prior to Testing



Figures 3: Trial Pit Towards the End of Testing

Infiltration testing to BRE Digest 365 standards was undertaken in the trial pit. The ground was found to have adequate infiltration capability with all three tests draining sufficiently. Of the tests undertaken in the trial pit the lowest infiltration rate encountered was **4.18E-05 m/s**. As such, infiltration is deemed viable as a means of surface water discharge. Refer to **Appendix C** for BRE365 infiltration test results.

British Geological Survey records note that the site is listed to have the following:

Superficial deposits: Tidal Flat Deposits - Clay, silt and sand. Sedimentary superficial deposit formed between 11.8 thousand years ago and the present during the Quaternary period.

Bedrock geology: South Wales Lower Coal Measures Formation - Mudstone, siltstone and sandstone. Sedimentary bedrock formed between 319 and 318 million years ago during the Carboniferous period.

1.4 Flood Risk

Flood risk has been assessed using the NRW development advice map and detailed view map. The site is located within Zone C1 of the DAM, thus, served by and benefiting from significant infrastructure, including River flood defences. Of which, the standard of protection is a 1 in 100-chance of flooding in any given year. Furthermore, upon review of the detailed view map the site is outside of both sea and surface water and small watercourse flood zones meaning it has less than 0.1% chance of flooding. The development site is however within a low-risk River flood zone meaning the risk of flooding in any given year is between 1 in 1000 (0.1%) and 1 in 100 (1%).

Moreover, a Flood Consequences Assessment (FCA) for the proposed development has been undertaken by Vale Consultancy (10986 – FCA – r01). The FCA concludes that the site is either at low or very low flood risk from all sources. It also finds that the proposals are deemed fully compliant with Planning Policy Wales (PPW) and TAN15. Modelled flood data obtained from NRW has been interrogated and the site is shown to be flood-free during all of the extreme fluvial and tidal flood events (including climate change) that the model considers.

Refer to **Appendix E** and **Appendix F** – Natural Resource Wales Development Advice Map & Detailed View Map, and Flood Consequence Assessment, respectively.

2 SURFACE WATER

2.1 Existing Drainage Systems

Surface water runoff from the existing site discharges to soakaway and infiltrates into the surrounding and underlying substrate. The site does not currently benefit from any formal surface water quality treatment. The existing foul discharges to the DCWW public sewer within Fenbrook Close.

Public sewer records have been obtained from DCWW. A 600mm public combined sewer is recorded just north of the site flowing north-east to south-west before leaving the site boundary and heading north-west. Public surface water sewers are also recorded in the vicinity. Specifically, a 300mm SW sewer in the east extent of the site flowing south to north until it cojoins with a 600mm SW sewer at manhole SS74916904 near the site access entrance where it flows north-east.

Correspondence between Vale Consultancy and DCWW have led to a mutual agreement that the extensions on the eastern face of the existing structure will not affect the adopted 300mm DCWW asset (SW) as the foundations of the extension will be lower than the sewer itself and thus will cause no detriment to it. Thus, an exception to this easement applies. However, easements on all other SW and FW sewers have been considered for this development.

2.2 Proposed Drainage Systems

2.2.1 **S1**: SuDS hierarchy of surface water discharge locations

The following receptors have been considered for surface water runoff on site, in order of SuDS preference. The aim of SuDS Standards is to ensuring that the most effective drainage scheme is delivered with the most preferred levels of surface water destination, where the design can move to the next means of discharge only under exception criteria.

1. Surface water collection for reuse.
2. Discharge by infiltration into ground
3. Discharge into open surface water body
4. Discharge into surface water sewer, highway drain, or other drainage system
5. Discharge into combined sewer.

Priority Level 1 - Surface water collected for reuse:

Rainwater harvesting is not proposed due to the practicalities of such a system as well as there being no foreseeable demand for non-potable water within the development proposals throughout its design life. There is also no foreseeable need to harvest water as DCWW has not identified any potential stresses on the mains water supply.

The need for non-potable water is low and the cost for such a system is high therefore it is deemed not feasible. The costs for installing such a system for a residential property set against the money saving due to reduced usage of potable water from the water provider typically results in a 50-60 year return.

No solution, move to next Priority Level

Priority Level 2 – Discharge via infiltration:

As explained in section 1.3, infiltration testing was undertaken by Vale Consultancy in October 2022. Infiltration testing to BRE Digest 365 standards was undertaken in the trial pit. In summary, the ground was found to have adequate infiltration capability with all tests in trial pit draining sufficiently. The location of the trial pit was in close proximity to the proposed SuDS feature which comprises a significant facet of the new surface water drainage system. Of the tests undertaken the lowest infiltration rate encountered was **4.18E-05** m/s.

As such, discharge via infiltration is deemed viable and a rate of **4.18E-05** m/s is to be used in design. The results for all three tests are included in **Appendix C**.

Priority Level 2 solution.

2.2.2 **S2**: Surface Water Runoff Hydraulic Control.

Proposed SuDS drainage system

The proposed SuDS drainage system is comprised of raingardens, a detention basin and geo-cellular soakaway crates. The aim is to collect and convey surface water from the new construction areas and discharge to the respective SuDS features before infiltrating into the existing ground. The areas which constitute this new construction area consist of the 'new front' extension; situated on the north-western face of the existing building, the proposed car park; including the new access route and parking bays, and lastly the two smaller extensions; located on the north-eastern face of the building.

Due to the spatial constraints with regard to DCWW easements for existing surface water and combined water sewers as well as Wales & West Utilities easements for existing gas mains, the remaining areas which are appropriate for proposing SuDS features are restricted. In particular, the proposed car park and the majority of the existing grass verge at the northern extent of the site boundary. In addition, the two smaller extensions on the north-eastern face of the existing building are also located in close proximity to the existing shared access route/car park for the boxing club itself as well as Port Talbot Town Cricket Club.

Therefore, with all this in mind, surface water incident upon the two smaller extensions will be collected and discharged directly into raingardens in order to provide treatment and improve water quality prior to discharge into the existing surface water system. Considering that these two extensions are situated on existing hardstanding paving and drain to the existing system without treatment, by proposing raingardens this will provide a betterment with regard water quality. It is worth emphasising that the existing surface water system discharges to a soakaway in the existing car park. Of which, should be sufficiently sized as this existing hardstanding area already drains to the soakaway and thus no additional contributing area is being discharged to it. Moreover, this solution is likely to reduce strain on the existing private drainage within the footprint of the site.

For the remaining 'new construction' area, comprised of the 'new front' extension as well as the car park, these catchments will all be drained to ACO channel drains located along the threshold between the pavement and new road construction as well as the pavement and the extension itself. In turn, these channels will then discharge all surface water towards a detention basin underlaid with geo-cellular soakaway crates which is situated within the grass verge on the northern extent of the site boundary. The SuDS features have been proposed in this area due to the spatial constraints aforementioned. The areas of the two smaller extensions have been included in the overall contributing area for the detention basin/geo-cellular soakaway crates when carrying out hydraulic control calculations. Hence, the new system will be able to attenuate rainfall for a 1 in 100-year + 30% climate change event for the entirety of the new construction area prior to discharge to the ground via infiltration.

Refer to **Appendix B** for the proposed surface water drainage plan illustrating how surface water is collected and conveyed towards their discharge locations.

Hydraulic Control

As the method of discharge is infiltration, there is no requirement to assess either the greenfield or brownfield runoff rates for the site as there will be no off-site discharge.

The depth of the detention basin and geo-cellular soakaway crates are designed to provide sufficient storage volumes such that no flooding will occur for all events up to and including the critical 1 in 100-year storm event plus 30% climate change. An additional allowance for urban creep is not deemed necessary given the sites size, constraints and extent of development. Any further development will require a new separate drainage

system. It is worth emphasising that the raingardens proposed are not designed for storage, although, they can provide a small volume of attenuation in extreme events. However, this has not been incorporated in any of the included calculations.

Refer to **Appendix D** for hydraulic calculations showing that sufficient attenuation storage is provided in the detention basin and geo-cellular soakaway crates.

Interception of runoff

For greenfield sites the majority of rainfall events during the year create no noticeable surface water runoff, the rainwater will normally evapotranspire or recharge groundwater. Whereas, impermeable surfaces generate runoff from virtually all rainfall events. Therefore, the development of greenfield sites changes its surface water runoff characteristics and can have a negative impact on the morphology and ecology of receiving watercourses.

By providing interception of runoff through SuDS systems developed sites can be designed so to have zero runoff for most small rainfall events and more closely replicate the surface water characteristics of its former greenfield state.

In accordance with the Sustainable Drainage Systems Standards for Wales 2018 Table G2.1 areas of a site drained to systems that are designed to infiltrate runoff for events greater than 1 month return period comply with interception requirements. This site will drain to systems designed to infiltrate runoff for events greater than a 1 month return period.

Exceedance Event Analysis & Management

It is necessary to assess the risk and consequence of flooding for exceedance events. This is to determine the likely flood volumes and water flow paths that would be caused by a storm event that exceeds the critical 1 in 100-year + 30% climate change allowance that the surface water drainage system is designed for.

The proposed detention basin and geo-cellular soakaway crates will have a depth of 400mm and 800mm, respectively, resulting in a 102mm freeboard for the 1 in 100-year + 30% climate change event. To assess the aforementioned SuDS features during an exceedance event, calculations have been conducted for the 1 in 1000-year rainfall event. In this instance, there was a maximum depth of 1215mm, resulting in a flooded volume of 2.9m² which is inconsequential if dispersed throughout the site.

If the drainage systems fail in an exceedance event surface water will flood from the proposed features and flow towards and dissipate throughout the grassed verge, as indicated on the flood exceedance plan in **Appendix B**. An event such as this is highly unlikely. However, the proposed drainage system will reduce the likelihood and severity of this when compared to the existing site because of the amount of attenuation storage being provided.

2.2.3 **S3:** Water Quality

To assess that the water quality being provided by the proposed SuDS solution is sufficient, the simple index approach as per section 26.7.1 of the CIRIA SuDS Manual 2015 is applied.

To deliver adequate water quality treatment the total SuDS mitigation index must be more than or equal to the pollution hazard index for each contaminant type. The pollution hazard and mitigation indices have been taken from tables 26.2 and 26.3 of the CIRIA SuDS Manual 2015.

Water quality - Simple Index Approach

Land Use	Pollution Hazard Level	Pollution hazard index			SuDS Components for land use	Mitigation Index			Mitigation hazard index > Pollution hazard index (for each contaminant type)
		Total Suspended Solids (TSS)	Metals	Hydrocarbons		Total Suspended Solids (TSS)	Metals	Hydrocarbons	
Commercial Car Park	Low	0.5	0.4	0.4	Detention Basin	0.5	0.5	0.6	Yes
Commercial Roof	Low	0.3	0.2	0.05	Detention Basin	0.5	0.5	0.6	Yes
Commercial Roof	Low	0.3	0.2	0.05	Bioretention system (Raingarden)	0.8	0.8	0.8	Yes

The proposed design will ensure that surface water runoff will pass through the SuDS components before discharging to ground. These SuDS components will separate the smaller particles and chemicals from the surface water discharge as it filters through providing sufficient water quality treatment to any discharging water.

2.2.4 **S4:** Amenity

Infiltration drainage is prioritised. The use of the raingardens and a detention basin will provide an attractive, high quality external space that will be used to serve the site, seamlessly integrating SuDS into the amenity areas of the site. The SuDS components will effectively drain surface water as close to the source as possible. The use of these features can also provide significant aesthetic benefit. Within the site constraints the proposed solution looks to maximise amenity benefits within the development proposals.

2.2.5 **S5**: Biodiversity

The use of raingardens and a detention basin can help to provide a new quality habitat for wildlife, having a positive contribution to biodiversity in the area. The use of planting native species can support local biodiversity by providing habitat and food for invertebrates and birds. Ephemeral water bodies can be a specific requirement for the life cycle of some plants and animals. A list of plants species suitable to the raingarden and swale environment which can be incorporated are included on the drainage plan (drawing no. 10986-500), refer to **Appendix B**.

2.2.6 **S6**: Operation and Maintenance Requirements

To ensure SuDS components continue to operate reliably regular inspection and maintenance should be carried out. In most cases, appropriate information should be provided by the relevant manufacturer on what has been installed, how it works, when to inspect it and whether maintenance will be required. CIRIA C753 The SuDS Manual also provides information on the operation and maintenance requirements for various SuDS components.

An inspection and maintenance plan has been produced for the site proposals, providing the site owner, who is responsible for the maintenance of the SuDS drainage system, guidance on the types and frequency of inspections and maintenance work that is required for the proposed SuDS elements. It also provides a cost estimate for the inspection and maintenance requirements over the development's lifetime.

Refer to **Appendix G – Management & Maintenance Plan**.

CONCLUSIONS

The **0.32ha** site at Baglan Boxing Club, Fenbrook Close, Port Talbot, SA12 7PA is to be developed such that three extensions will be built upon the existing structure and a new access road and car park is to be constructed. Two of which will be used as meeting/utility rooms whereas the larger extension at the 'new front' of the building will consist of a reception, office and kitchen/lounge. Although the total area enclosed in the site boundary is **0.32ha** the SAB boundary which defines the new construction area is only **760m²**. Surface water incident upon the roof of the extensions will be collected and conveyed towards each respective SuDS feature, as described in **Section 2.2.2** of this report.

Following the hierarchical approach to discharge location of surface water for new developments as set out in the Statutory Standards for SuDS. The proposed development will be provided with a new sustainable surface water drainage system that will discharge to ground via infiltration following positive infiltration testing at the site. It will incorporate SuDS features providing a solution that will manage surface water for storm events up to a 100-year return period plus 30% climate change allowance whilst also providing improved water quality treatment, amenity and biodiversity.

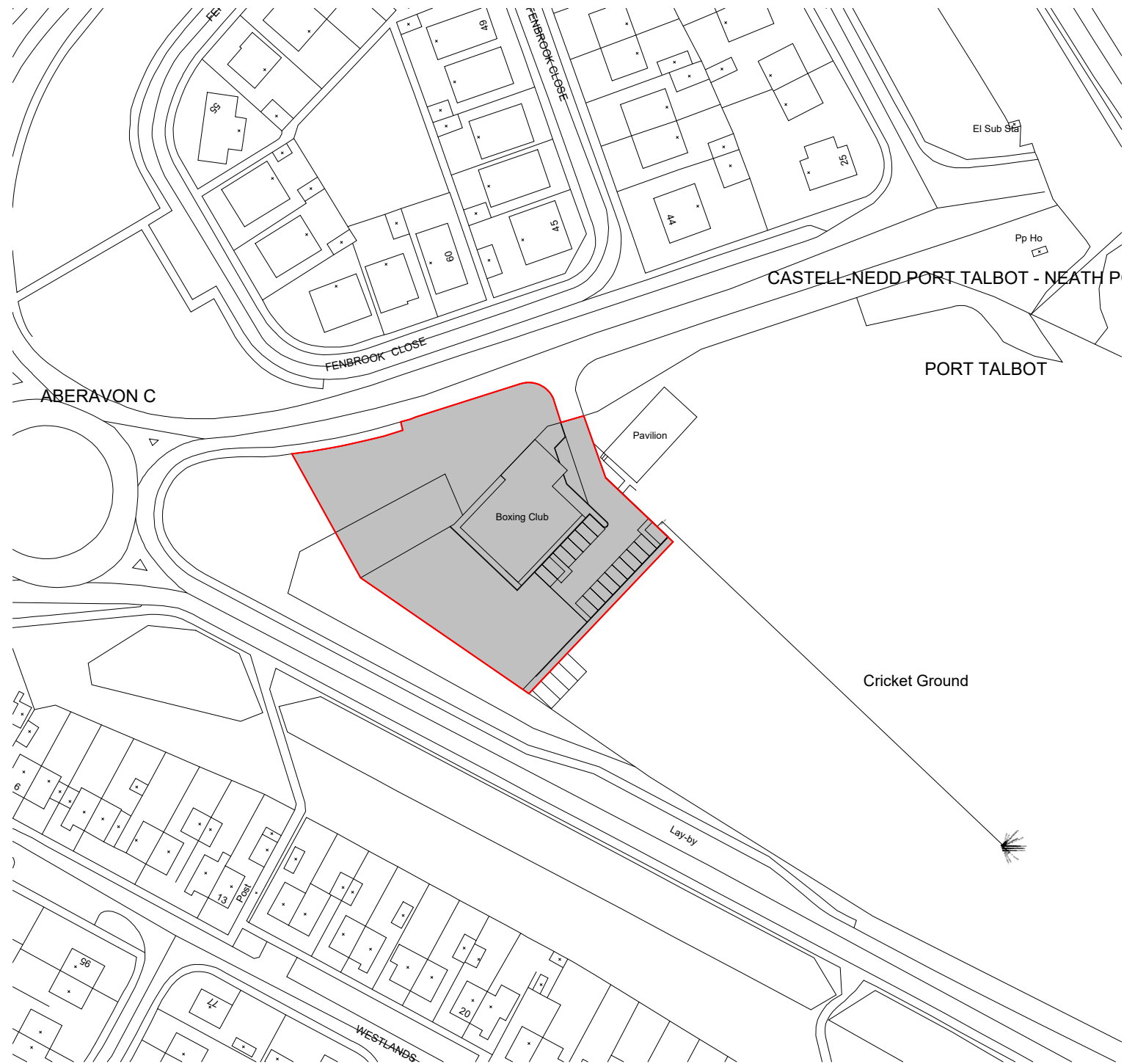
The SuDS component considered suitable for this site consist of a detention basin, geo-cellular soakaway crates, and raingardens. Surface water from the site will flow from the roof of the extensions and conveyed towards and discharged to the respective SuDS component as illustrate on the drainage plan which can be found in **Appendix B**. In the event of exceedances flows surface water runoff will flow from the proposed SuDS features and dissipate across the grassed verge.

The storage volume provided in the detention basin and geo-cellular soakaway crates have been calculated such that all surface water runoff from the development site will be contained for the critical duration 1 in 100-year storm event plus 30% climate change, refer to **Appendix D – Design Calculations**.

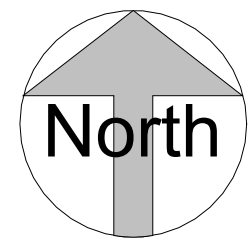
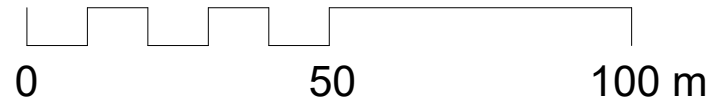
Foul water drainage is required for the new extensions and will connect appropriately to the existing foul drainage system. Existing drainage within the footprint of the new building will also be dealt with in accordance with building regulations. Any external manholes that will become internal will have new double sealed covers, if appropriate.

Overall, the proposed surface water drainage system seeks to be a cost effective and easily maintainable sustainable drainage solution. The surface water discharge location is the most appropriate and preferred method within the sites constraints and the SuDS components incorporated in the design provide water quality treatment, amenity and biodiversity benefits. The amount of SuDS proposed seems appropriate given the nature of the development and the constraints of the site.

APPENDIX A: Existing Site Plans



1 **Location Map**
1 : 1250



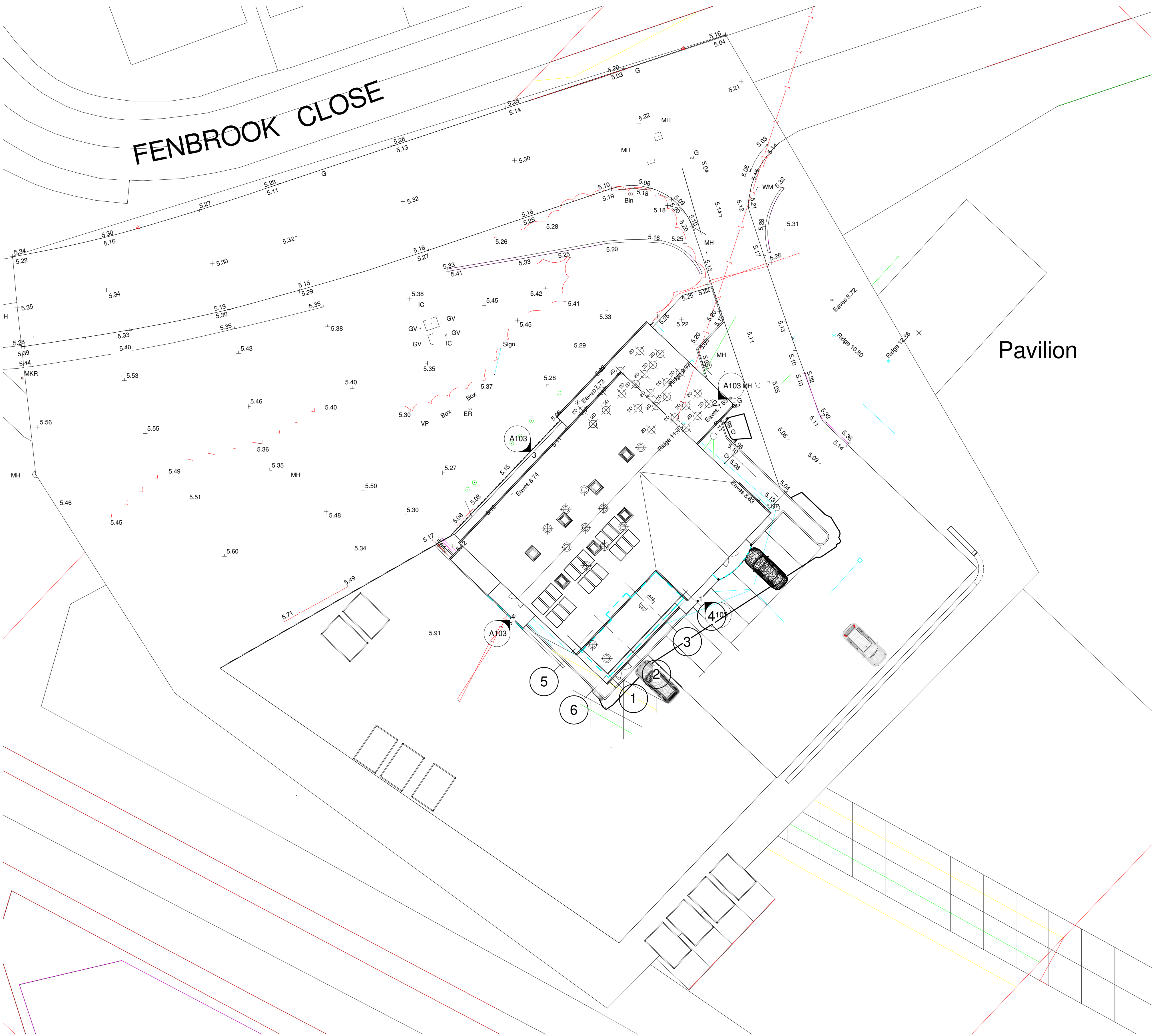
NOTES

1. All dimensions are in millimetres unless noted otherwise.
2. All levels are shown in millimetres unless noted otherwise.
3. Do not scale from the drawing. Use figured dimensions only.
4. Any discrepancies to be reported immediately to the Designer/Engineer.
5. This drawing to be read in conjunction with all relevant Architects, engineers, subcontractors and specialists drawings and specifications.

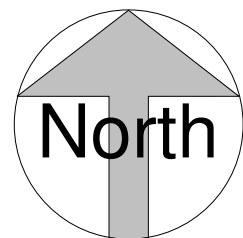
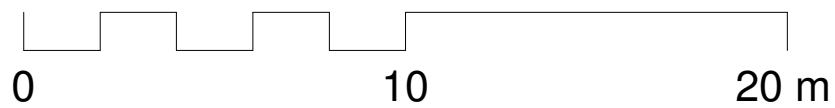
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CDM - If we are appointed as a Designer or Principal Designer, for the Pre-Construction Phase only, we can only carry out our duties for that phase. This means that we will give all relevant design information for consideration in the Construction Phase Plan / Health & Safety File to the Client at the end of the Pre-Construction Phase. It will be the Client's responsibility to pass that information on to the Principal Contractor and any other Contractors or Designers, which the client subsequently appoints.

rev.	drawn	chkd.	apprvd.	date	description
Client					
Baglan Boxing Club					
Fenbrook Close					
Port Talbot					
SA12 7PA					
Project					
New Entrance Extension					
Title					
Location map					
360AD Limited Architectural Design & Visualisation Consultancy First floor 29 Bocam Park Pencoed Bridgend CF35 5LJ t: 01656330997 email enquiries@360ad.co.uk web www.360ad.co.uk 					
date		drawn		checked	
November 2022		ND		ND	
scale @ A3		Project number			
1 : 1250		10-026			
Status	System Number			drg. no.	rev.
Building	20-026-d			A100	



1 Site
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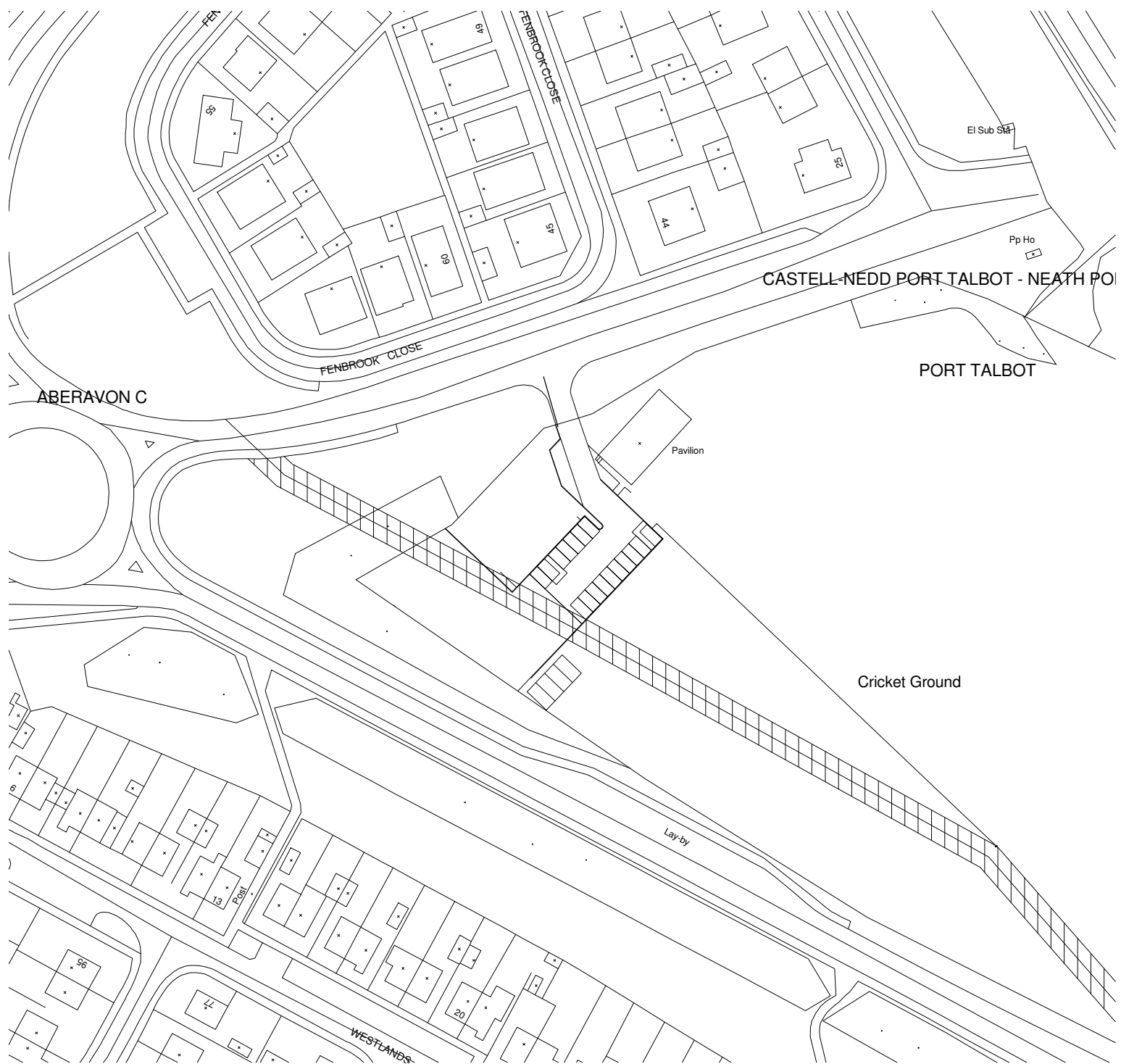


Pavilion

- NOTES
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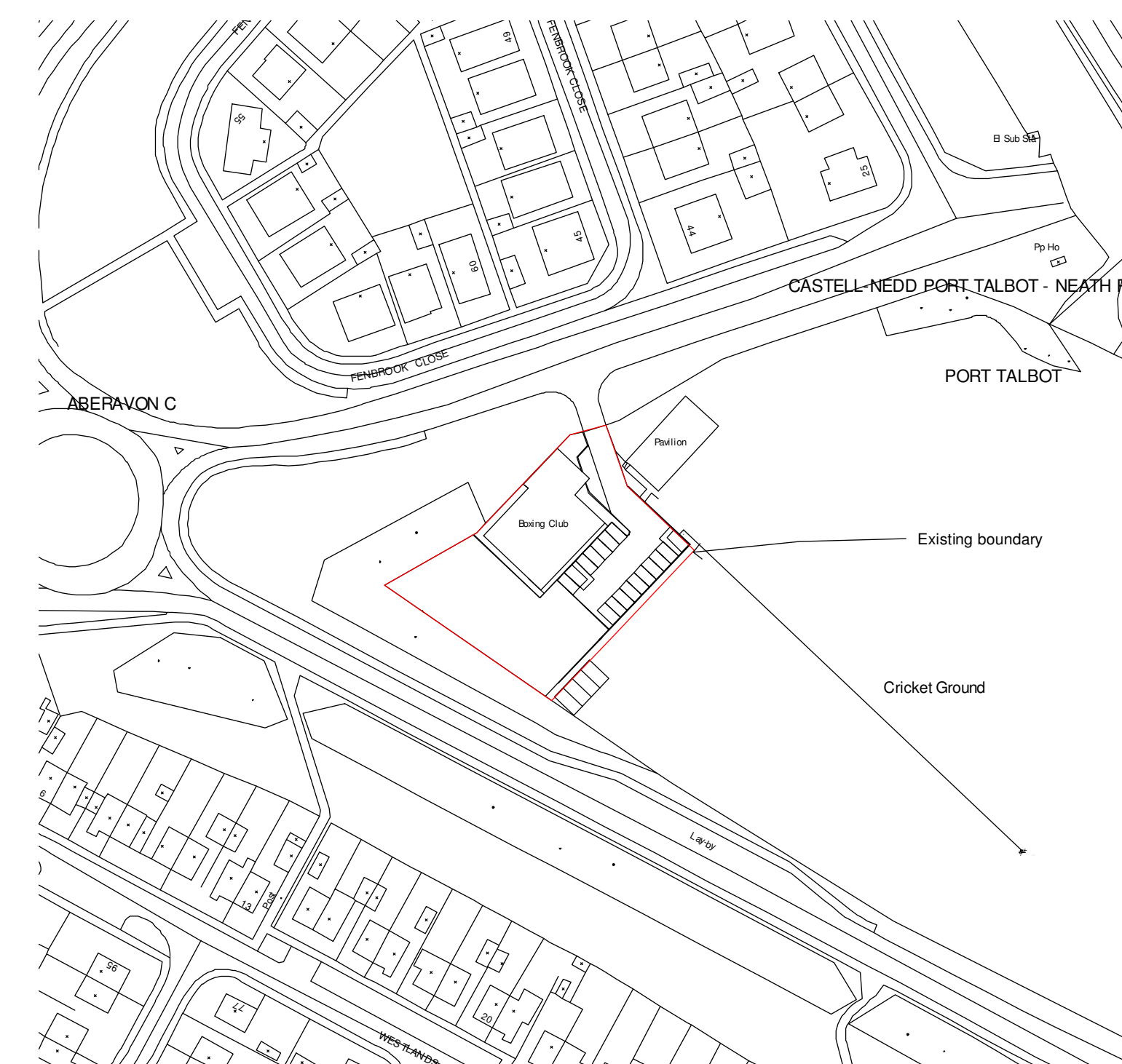
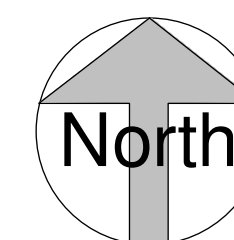
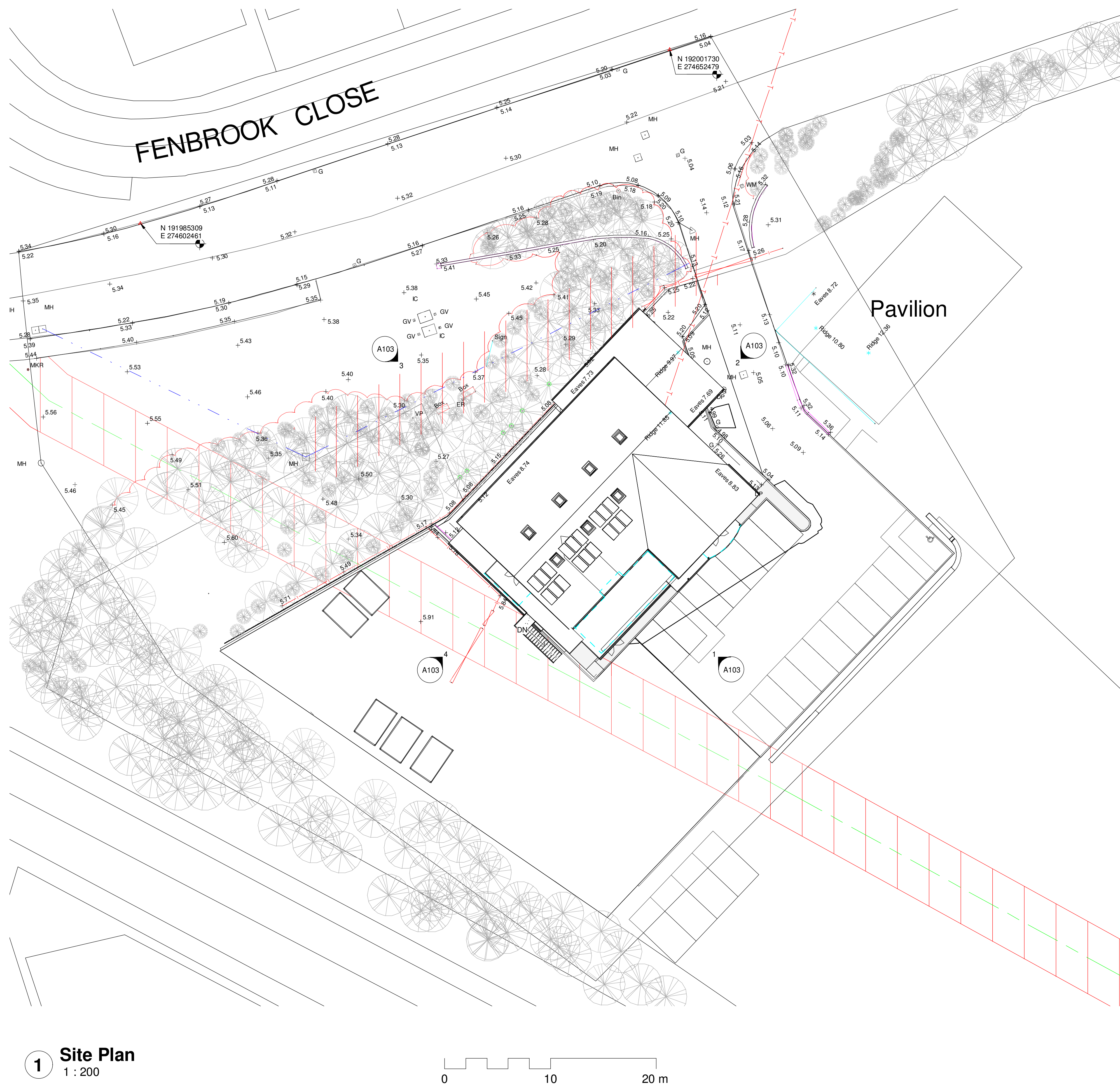
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2 Location
1 : 1250

rev.	drawn	chkd.	apprd.	date	description	
					Client	
Baglan Boxing Club						
Fenbrook Close						
Port Talbot						
SA12 7PA						
Project						
Project Name						
Title						
Site						
360AD Limited Architectural Design & Visualisation Consultancy First floor, 29 Bocam Park Pencoed, Bridgend, CF35 5LJ t: 01656330997 email: enquiries@360ad.co.uk web: www.360ad.co.uk						
date	drawn	checked	approved			
July 2020	GT	ND				
scale @ A1		Project number				
As indicated		10-026				
status	System Number				drg. no.	rev.
Project Status	20-026				A101	



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APPENDIX B: Proposed Site Plans



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Existing Ridge
11812

Proposed Abutment 1
9365

Meeting room
8595

Ground Floor
5260

Lead work flashing as per notes

Tapered roof section to avoid WW easement zone

Possible Signage to separate advertising consent

Proposed Ridge 1
14026

Existing velux roof light to be removed and roof covering to be made good

Lead work flashing as per notes

New doors & windows to match the existing

Brickwork & banding to match the existing

Existing security fence to be adjusted accordingly

Ground Floor
5260

Existing Ridge

Proposed Ridge 1

11036

New parking area to existing levels

1st Floor

8942

Meeting room

8595

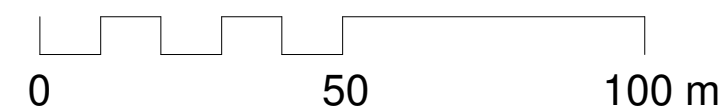
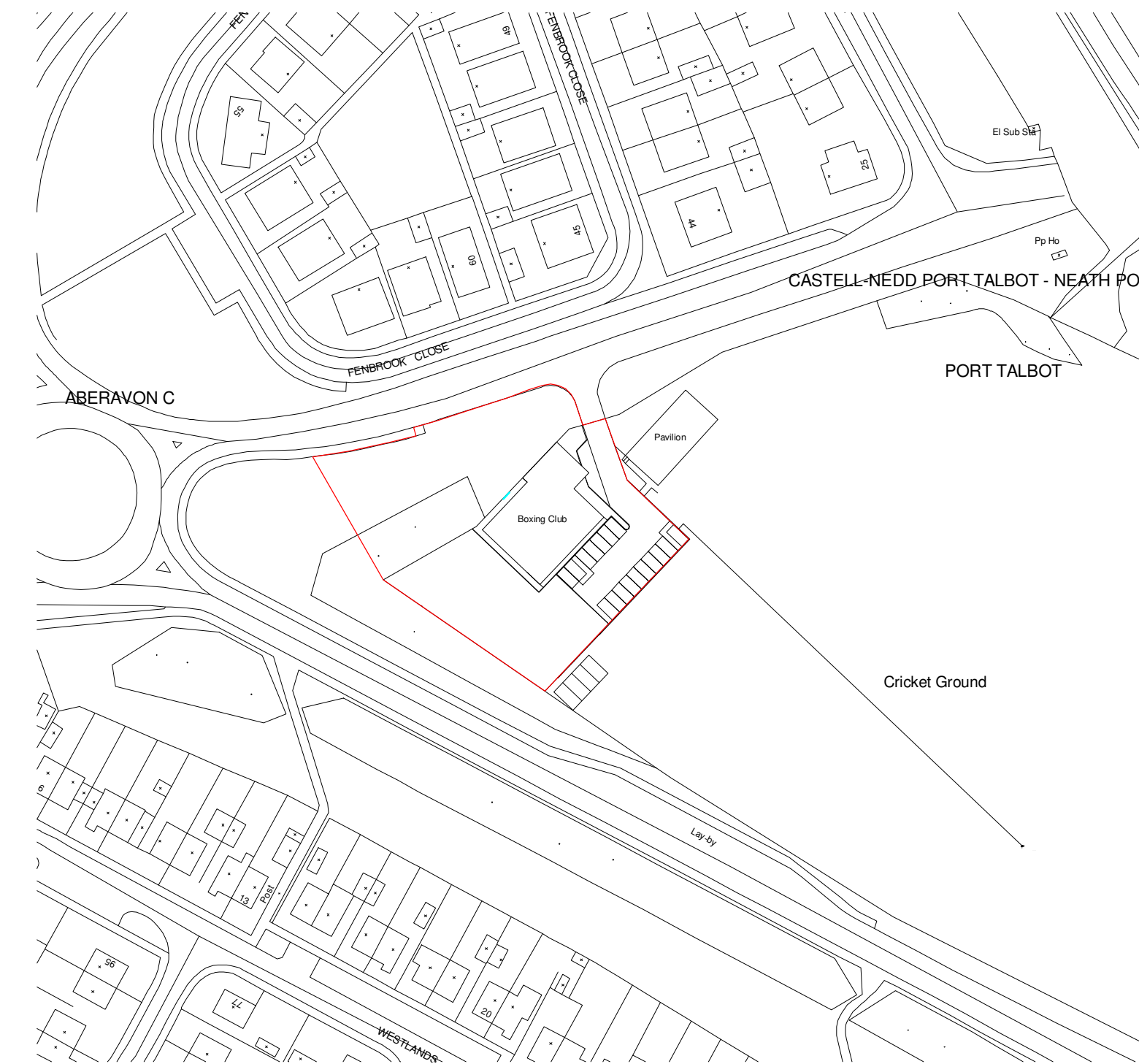
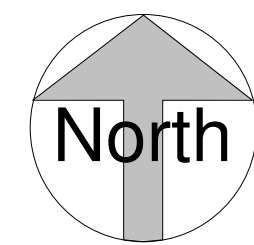
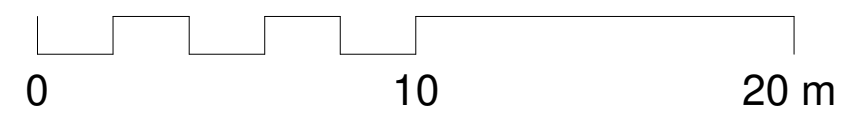
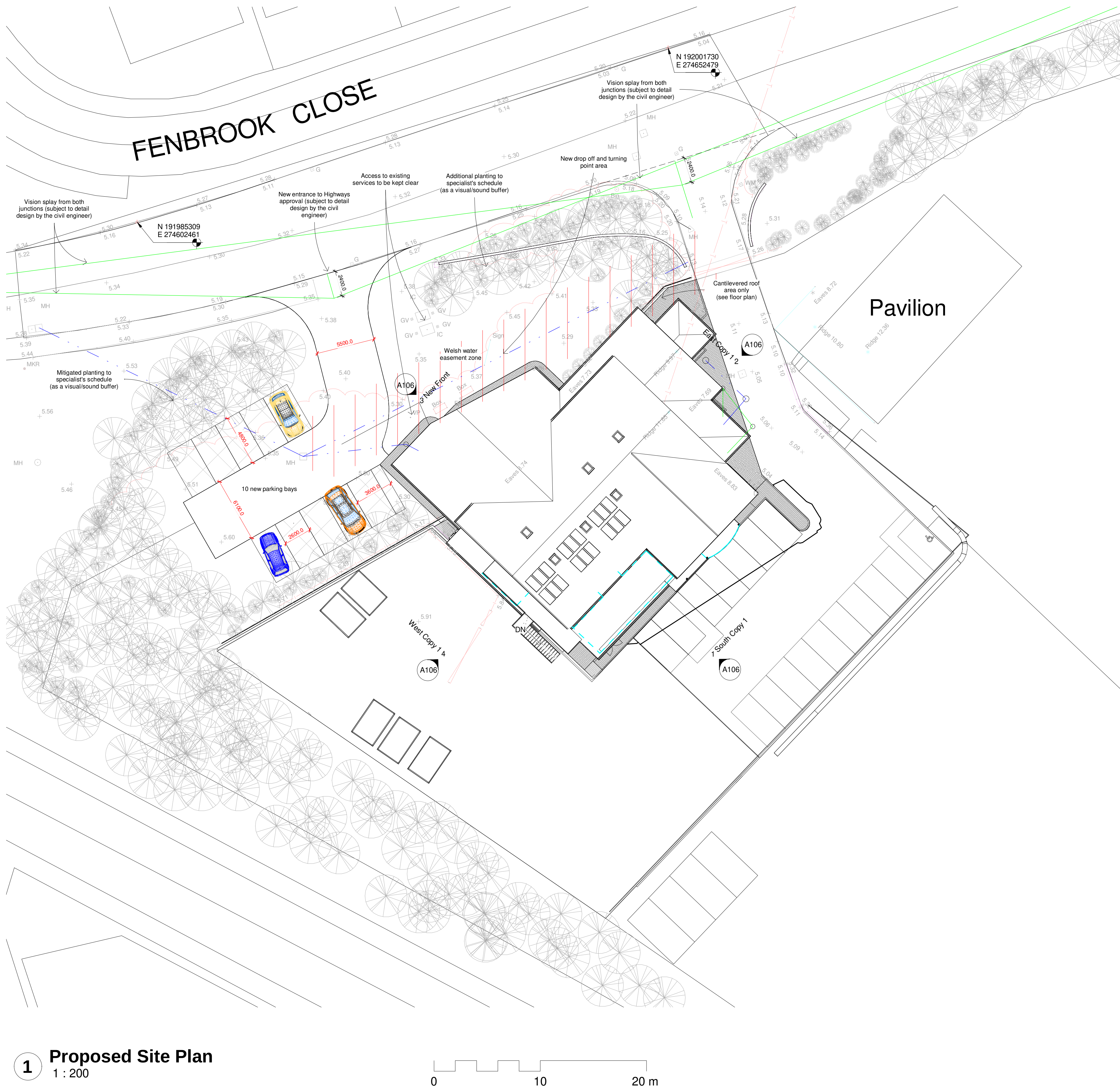
Ground Floor

5260

RWDP

PLANNING ONLY

[illegible]



FOR BUILDING
CONTROL APPROVAL

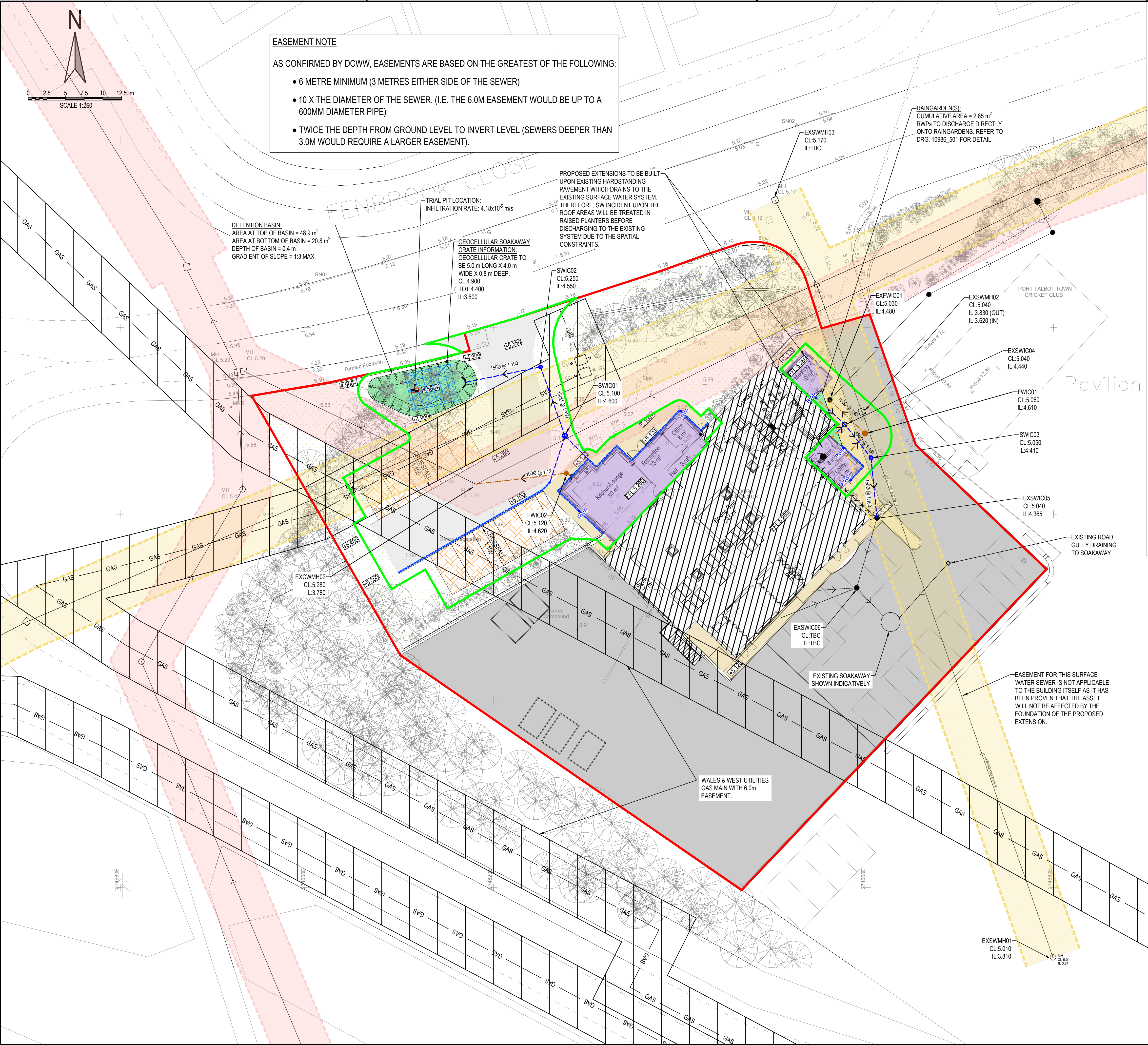
NOTES

- All dimensions are in millimetres unless noted otherwise.
- All levels are shown in millimetres unless noted otherwise.
- Do not scale from the drawing. Use figured dimensions only.
- Any discrepancies to be reported immediately to the Designer/Engineer.
- This drawing to be read in conjunction with all relevant Architects, engineers, subcontractors and specialists drawings and specifications.

ALL DIMENSIONS TO BE CHECKED ON SITE: Contractor to check and verify all building and site dimensions. The Contractor is to comply in all respects with the current Building Regulations whether specifically stated on this drawing or not. This drawing must be read and checked against any other specialist drawings provided & manufacturer's recommendations. Tabulated quantities are for guidance only all specialist Consultants & Contractors to check and verify. Any discrepancies in all of the above must be reported to the Design team prior to installation.

CDM - If we are appointed as a Designer or Principal Designer, for the Pre-Construction Phase only, we can only carry out our duties for that phase. This means that we will give all relevant design information for consideration in the Construction Phase Plan / Health & Safety File to the Client at the end of the Pre-Construction Phase. It will be the Client's responsibility to pass that information on to the Principal Contractor and any other Contractors or Designers, which the client subsequently appoints.

rev.	drawn	chkd.	appvd.	date	description
C	ND	ND		20/1/21	Reduced hardstand
B	ND	ND		21/10/21	Added Visions Splays
A	ND	ND		18/10/21	Parking alterations
Client					
Baglan Boxing Club Fenbrook Close Port Talbot SA12 7PA					
Project					
New Entrance Extension					
Title					
Proposed Site & Location Map					
360AD Limited Architectural Design & Visualisation Consultancy First floor 29 Bocam Park Pencoed Bridgend CF35 5LJ T 01656330997 email enquiries@360ad.co.uk web www.360ad.co.uk 360AD					
date	November 2022	drawn	ND	checked	ND
scale @ A1	As indicated	Project number	10-026	approved	
status	Building	System Number	20-026-f	drg. no.	A104
				rev.	C



EASEMENT NOTE

AS CONFIRMED BY DCWW, EASEMENTS ARE BASED ON THE GREATEST OF THE FOLLOWING:

- 6 METRE MINIMUM (3 METRES EITHER SIDE OF THE SEWER)
- 10 X THE DIAMETER OF THE SEWER. (I.E. THE 6.0M EASEMENT WOULD BE UP TO A 600MM DIAMETER PIPE)
- TWICE THE DEPTH FROM GROUND LEVEL TO INVERT LEVEL (SEWERS DEEPER THAN 3.0M WOULD REQUIRE A LARGER EASEMENT).

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THE DRAWING. USE FIGURED DIMENSIONS ONLY.
4. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE ENGINEER.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS, SUBCONTRACTORS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.
6. EXISTING SERVICES HAVE NOT BEEN SHOWN BUT ARE PRESENT - THE CONTRACTOR IS TO LIAISE WITH ALL STATUTORY AUTHORITIES PRIOR TO THE COMMENCEMENT OF ANY WORKS.

ADDITIONAL NOTES:

1. MH COVERS AND FRAMES TO CONFORM TO BS EN 124: -HIGHWAYS AND FOOTWAYS TO FRONT OF BUILDINGS (D400) -FOOTWAYS TO REAR OF BUILDINGS (C250)
2. TYPE S BEDDING AND SURROUND TO ALL PIPES EXCEPT IN THE FOLLOWING CIRCUMSTANCES, IN WHICH TYPE Z BEDDING AND SURROUND ARE TO BE USED:
 - DOMESTIC GARDENS AND PATHWAYS WITHOUT ANY POSSIBILITY OF VEHICULAR ACCESS, 0.35m;
 - DOMESTIC DRIVEWAYS, PARKING AREAS AND YARDS WITH HEIGHT RESTRICTIONS TO PREVENT ENTRY BY VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 0.5m;
 - DOMESTIC DRIVEWAYS, PARKING AREAS AND NARROW STREETS WITHOUT FOOTWAYS (E.G. MEWS DEVELOPMENT) WITH LIMITED ACCESS FOR VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 0.9m;
 - AGRICULTURAL LAND AND PUBLIC OPEN SPACE, 0.9m;
 - HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS TO VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 1.2m.
3. ALL EXISTING MANHOLE INVERTS TO BE CHECKED AND REPORTED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF DRAINAGE WORKS. EXISTING PIPE CONNECTIONS ARE TO BE CCTV SURVEYED AND INSPECTED BY THE ENGINEER AND LOCAL AUTHORITY. IF THE PIPE CONNECTION IS FOUND TO BE DAMAGED OR IN DISTRESS, THE CONTRACTOR IS TO CARRY OUT REMEDIAL WORKS OR PROVIDE A NEW CONNECTION TO THE EXISTING SEWER (PIPE SIZE AND GRADIENT TO BE DETERMINED BY THE ENGINEER).
4. THE GRADIENTS INDICATED AGAINST THE DRAIN RUNS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL INSTALL DRAINS TO THE INVERT LEVELS SHOWN FOR EACH MANHOLE OR OTHER INDICATED POSITION.
5. ALL PLOT FOUL DRAINAGE TO BE MINIMUM 100mm DIAMETER UNLESS OTHERWISE NOTED.
6. ALL ADAPTABLE THERMOPLASTIC STRUCTURED WALL SEWER PIPE SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 13476-1 AND VIS 4-35-01 AND BS EN 13476-2 OR BS EN 13476-3. PIPES SHALL BE BSI KITEMARKED OR HAVE EQUIVALENT THIRD PARTY CERTIFICATION. PIPES LESS THAN OR EQUAL TO 500mm DIA. SHALL HAVE A SHORT-TERM RING STIFFNESS OF NOT LESS THAN 8kN/m² (SN8).
7. ALL JOINTING IN ACCORDANCE WITH MANUFACTURERS TECHNICAL ADVICE & SPECIFICATION.
8. ALL NON ADAPTABLE DRAINAGE TO BE THE STANDARD UPVC 110mm, 160mm DRAINAGE AND MANUFACTURED TO BS-EN 1401 AND BS 4660 UNLESS NOTED OTHERWISE.
9. ALL PERMEABLE PAVING CELLS TO HOUSE LATERAL FIN DRAIN ALONG LOWER EDGE WITH 1500 CONNECTION PIPE.
10. ALL STORM WATER DRAINAGE TO BE A MINIMUM OF 150mm DIAMETER UNLESS OTHERWISE NOTED.
11. SOIL & VENT PIPE LOCATION AND NUMBER TO BE CONFIRMED WITH ARCHITECT.
12. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS DRAWINGS, TOGETHER WITH THEIR LATEST SPECIFICATIONS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER (VALE CONSULTANCY) AS SOON AS POSSIBLE.
13. FIGURED DIMENSIONS ONLY TO BE USED. ANY QUERIES OR DISCREPANCIES TO BE REFERRED TO THE ENGINEER (VALE CONSULTANCY) IMMEDIATELY.
14. PRIOR TO ORDERING ANY MATERIALS THE CONTRACTOR IS TO CONFIRM MANUFACTURER/PIPE MATERIAL AND GRADE PROPOSED WITH WATER AUTHORITY.
15. TEMPORARY WORKS DESIGN BY OTHERS.
16. DESIGN RISK ASSESSMENTS AND METHOD STATEMENTS ARE TO BE PROVIDED TO THE PRINCIPLE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY WORKS.

LEGEND

- PROPOSED HARDSTANDING
- PROPOSED EXTENSIONS
- GRASS / SOFT LANDSCAPING
- PAVING TO ARCHITECTS REQUIREMENTS
- EXISTING TARMAC
- EXISTING BUILDING
- TRADITIONAL BLOCK PAVING
- BIORETENTION RAINGARDEN
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED FOUL WATER DRAINAGE
- EXISTING COMBINED DRAINAGE
- EXISTING SURFACE WATER DRAINAGE
- EXISTING FOUL WATER DRAINAGE
- PROPOSED RAINWATER PIPE
- ACO CHANNEL DRAIN
- PERFORATED PIPE
- PROPOSED HEADWALL
- GEO-CELLULAR TANK 1 IN 100 YEAR EVENT WITH ACCESS POINTS
- PROPOSED SPOT LEVEL
- EXISTING SPOT LEVEL
- DCWW SW EASEMENT BOUNDARY
- DCWW CW EASEMENT BOUNDARY
- SAB BOUNDARY
- SITE BOUNDARY

FOR CONSTRUCTION DETAILS PLEASE SEE DRG. 10986_501.

PLANTING SCHEDULE - BIORETENTION AREAS (RAISED PLANTERS)

PLANTS WITHIN BIORETENTION AREAS (RAINGARDENS) SHOULD BE PLANTED WITH THE FOLLOWING SPECIES AT A DENSITY OF 4NO PLANTS/M²:

- PURPLE LOOSESTRIPE (LYTHRUM SALICARIA)
- WATER MINT (MENTHA AQUATICA)
- HEMP AGRIMONY (EUPATORIUM CANNABINUM)
- RAGGED ROBIN (LYCHNIS FLOS-CUCULI)
- MARSH WOUNDWORT (STACHYS PALUSTRIS)
- SOFT RUSH (JUNCUS EFFUSUS)
- ROYAL FERN (OSMUNDA REGALIS)
- BUGLE (AJUGA REPTANS)
- CHIVES (ALLIUM SCHOENOPRASUM)
- CHOISYA DEWITTEANA WHITE DAZZLER
- CORNUS STOLONIFERA 'KELSEY'
- CORNUS SANGUINEA 'MIDWINTER FIRE'

PLANTING SCHEDULE - DETENTION BASIN

PLANTS WITHIN DETENTION BASINS AND SWALES SHOULD BE PLANTED WITH THE FOLLOWING BECAUSE OF THEIR RESILIENCE WITHIN THE INTENDED ENVIRONMENT AND WILL ALSO CONTRIBUTE TOWARDS LOCAL BIODIVERSITY

SHRUBS

- CORNUS ALBA 'SIBIRICA' DOGWOOD
- CORNUS STOLONIFERA 'FLAVIRAMEA'
- SALIX ELAEAGNOS

HERBACEOUS PLANTS - AT THE BASE OF THE SUDS FEATURES / THE DAMPER AREAS

- CAREX PENDULA SEDGE
- CAREX RIPARIA SEDGE
- FILIPENDULA ULMARIA MEADOWSWEET
- GEUM RIVALE WATER AVENS
- IRIS SIBIRICA
- JUNCUS EFFUSUS COMMON RUSH
- SILENE FLOS CUCULI RAGGED ROBIN
- LOBELIA CARDINALIS
- LYSIMACHIA PUNCTATA YELLOW LOOSESTRIPE
- LYTHRUM SALICARIA PURPLE LOOSESTRIPE
- MATTEUCCIA STRUTHIOPTERIS SHUTTLECOCK FERN

SHRUBS AROUND THE TOP EDGES OF THE FEATURES - THE DRY PARTS

- CARYOPTERIS CLAUDON 'HEAVENLY BLUE'
- LAVANDULA ANGLUSTIFOLIA 'HIDCOTE'
- PEROVSKIA ATRIPLICIFOLIA 'BLUE SPIRE'
- SPIRAEA JAPONICA 'ANTHONY WATERER'
- VERBENA BONARIENSIS

03	NRC	FP	MJ	20.11.23	SITE LAYOUT CHANGED
02	NRC	FP	MJ	20.11.23	REVISED FOR ARCHITECTS COMMENTS
01	NRC	FP	MJ	02.12.22	ISSUED FOR SAB APPROVAL

rev.	drawn	checked	approved	date	description
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Client
BAGLAN BOXING CLUB

Project
**BAGLAN BOXING CLUB
FENBROOK CLOSE
PORT TALBOT, SA12 7PA**

Title
DRAINAGE PLAN



29 Bocam Park, Old Field Road, Pencoed, Bridgend CF35 5LJ.
Phone: 01656 863794 Email: enquiries@vale-consultancy.co.uk

date	drawn	checked	approved
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29.11.22	NRC	FP	MJ
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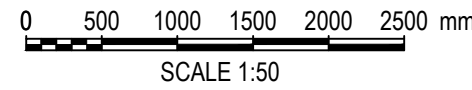
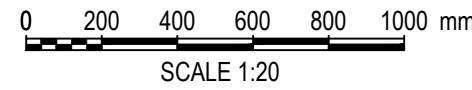
scale @ A1	project no.
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1:250	10986
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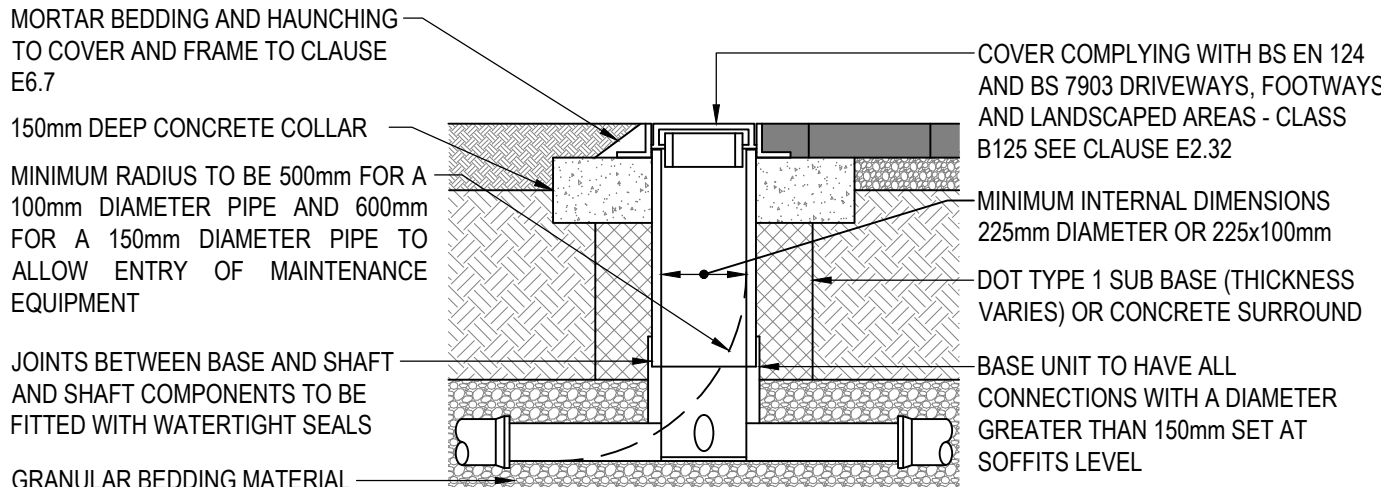
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A 10986_500 03

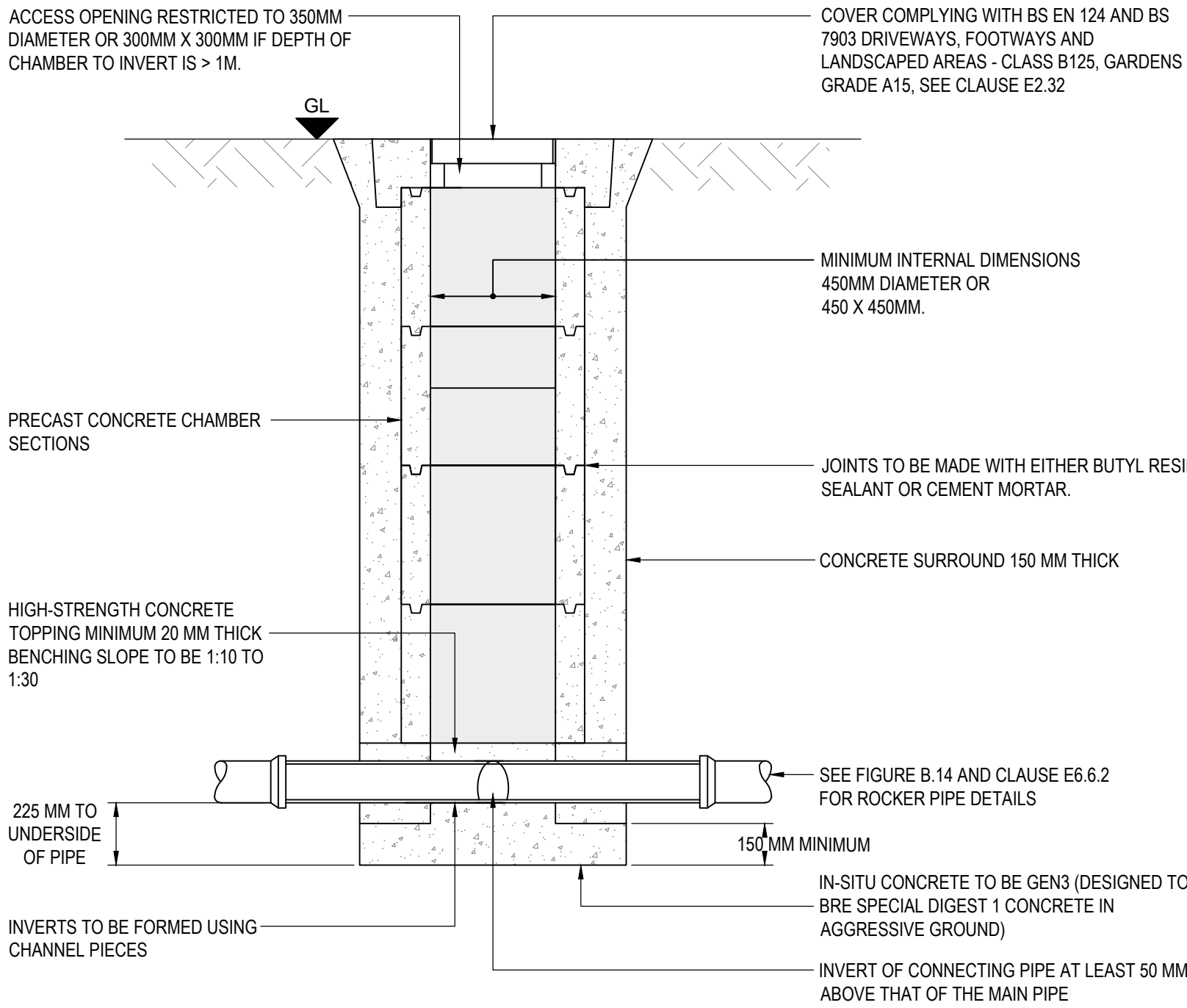
DRAWING STATUS
A - Approval, AB - As-Built, C - Construction, D - Draft, P - Preliminary, T - Tender



MAXIMUM DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 2m. NON-ENTRY PLASTIC CHAMBERS AND RINGS SHALL COMPLY WITH BS EN 13598-1 AND BS EN 13598-2 OR HAVE EQUIVALENT INDEPENDENT APPROVAL

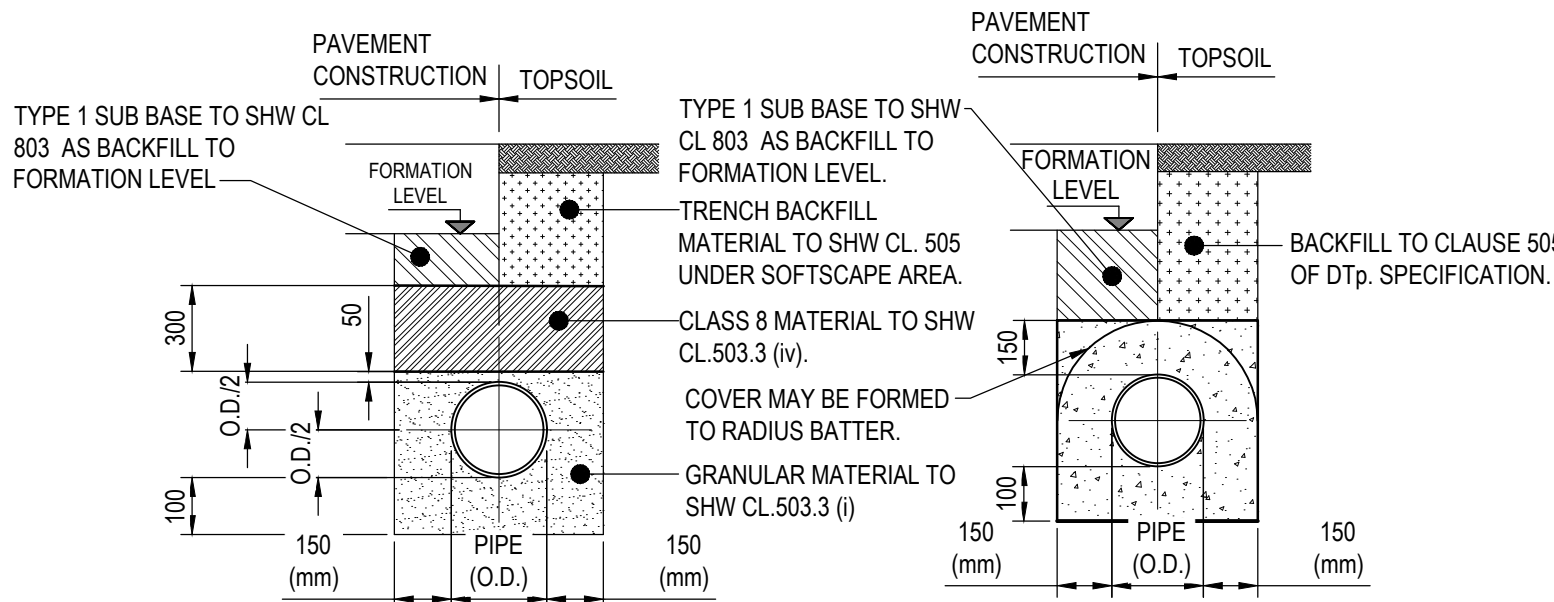


TYPICAL INSPECTION CHAMBER DETAIL - TYPE 4A
WITHIN PAVED AREAS
(REFER TO FIG. B.21 OF SFA FOR ADAPTATION TO SLO. SITED IN UNPAVED AREAS)
(FOR USE IN PAVED AREAS)
SCALE 1:20



TYPICAL INSPECTION CHAMBER DETAIL (RIGID MATERIAL DETAIL) - TYPE 3

ALTERNATIVE MAXIMUM DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 3M FOR AREAS NOT SUBJECT TO VEHICLE LOADING OR AREAS SUBJECT TO LIGHT VEHICLE LOADING, NON-ENTRY.
N.T.S.



TYPE S BEDDING

GRANULAR BED AND SURROUND UNDER ROAD
(BEDDING FRACTION = 2.2)
SCALE 1:20

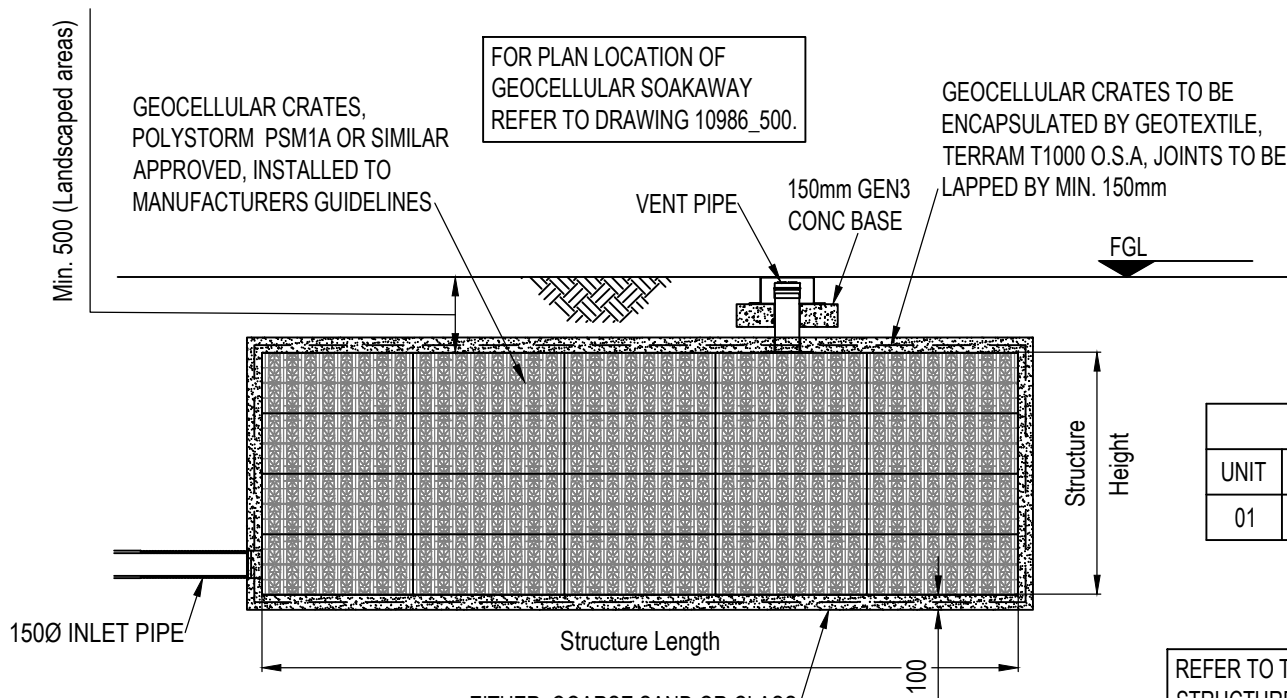
- NOTES:
- REFER TO SHW TABLE S/3 AND SHW TABLE 6/1
 - BEDDING BENEATH AND AT SIDES OF THE PIPE TO BE WELL COMPACTED IN ACCORDANCE WITH CL 505.
 - CONCRETE CRADLES AND ARCHES MAY BE EXTENDED TO THE SIDES OF THE TRENCH.
 - GEOTEXTILES MAY BE USED WHERE DIRECTED OR APPROVED BY THE ENGINEER TO CONTAIN BEDDING MATERIAL IN CERTAIN SOILS E.G. RUNNING SAND.
 - IN VERY WET CONDITIONS, WHERE DIRECTED OR APPROVED BY THE ENGINEER A TEMPORARY LAND DRAIN MAY BE LAID WITHIN THE GRANULAR BED.
- NOTES: (TYPE Z ONLY)
- WHERE PIPES WITH FLEXIBLE JOINTS ARE USED, THE CONCRETE PROTECTION IS TO BE INTERRUPTED OVER ITS FULL CROSS SECTION AT INTERVALS NOT EXCEEDING 5 METRES (OR AS DIRECTED BY THE ENGINEER) BY A SHAPED FORMER OF BITUMEN IMPREGNATED COMPRESSIBLE FILLER. THESE INTERRUPTIONS SHALL COINCIDE WITH PIPE JOINTS. SEE DIMENSIONS FOR PIPE BEDDING TABLE FOR THICKNESS OF COMPRESSIBLE FILLER.
 - CONCRETE TO BE GRADE GEN 3. WHERE FLEXIBLE PIPES ARE USED, CARE MUST BE TAKEN
 - TO PREVENT THE PIPES FROM FLOATING.

TYPE Z BEDDING

CONCRETE BED AND SURROUND
(BEDDING FRACTION = 2.6)
SCALE 1:20

BEDDING DETAILS

SCALE 1:20

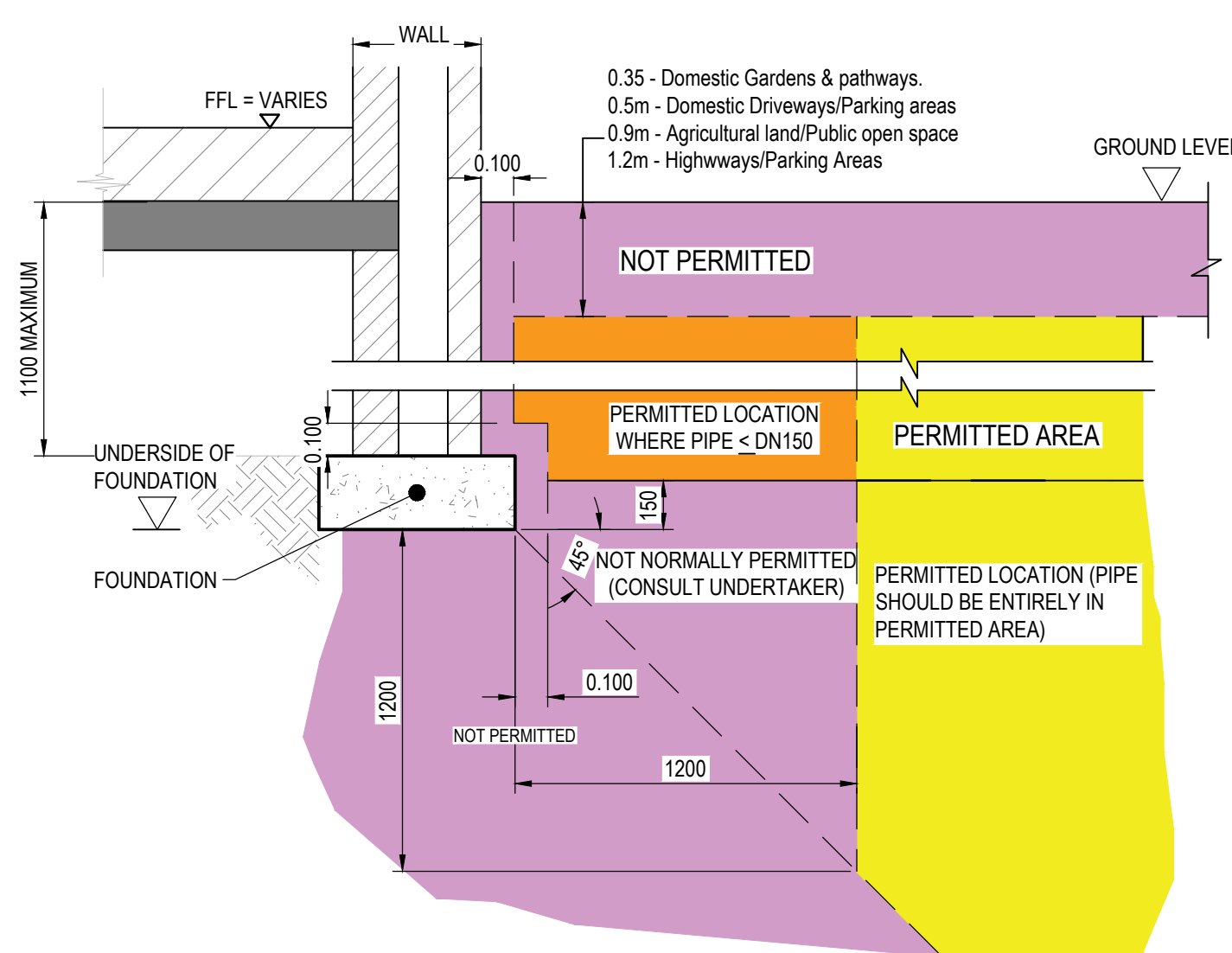


GEOCELLULAR CRATE SOAKAWAY

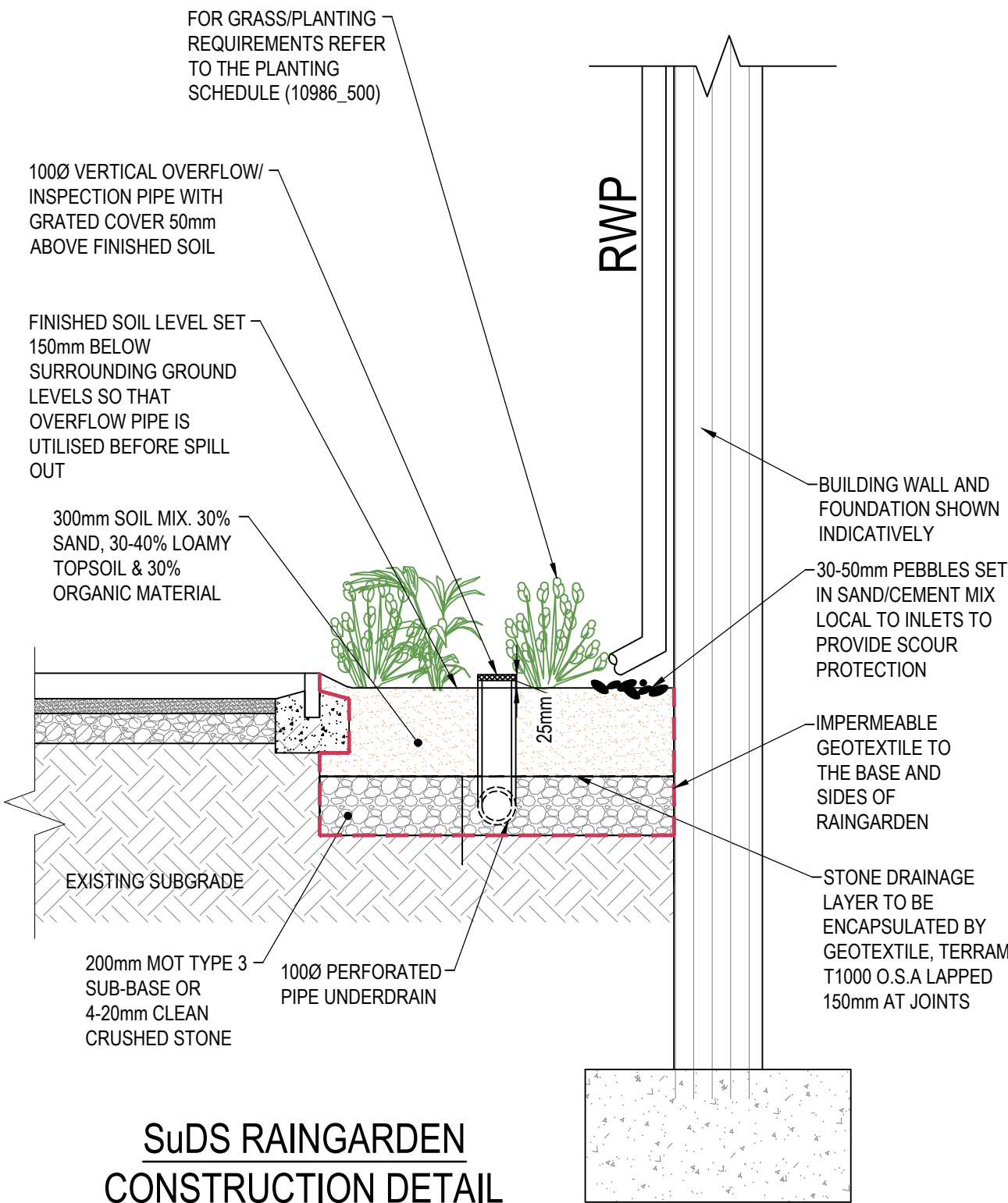
SCALE 1:50

GEOCELLULAR SOAKAWAY TABLE				
UNIT	AREA (m ²)	LENGTH (m)	WIDTH (m)	HEIGHT (m)
01	20	5	4	0.8

REFER TO TABLE FOR STRUCTURE HEIGHT, WIDTH & DEPTH

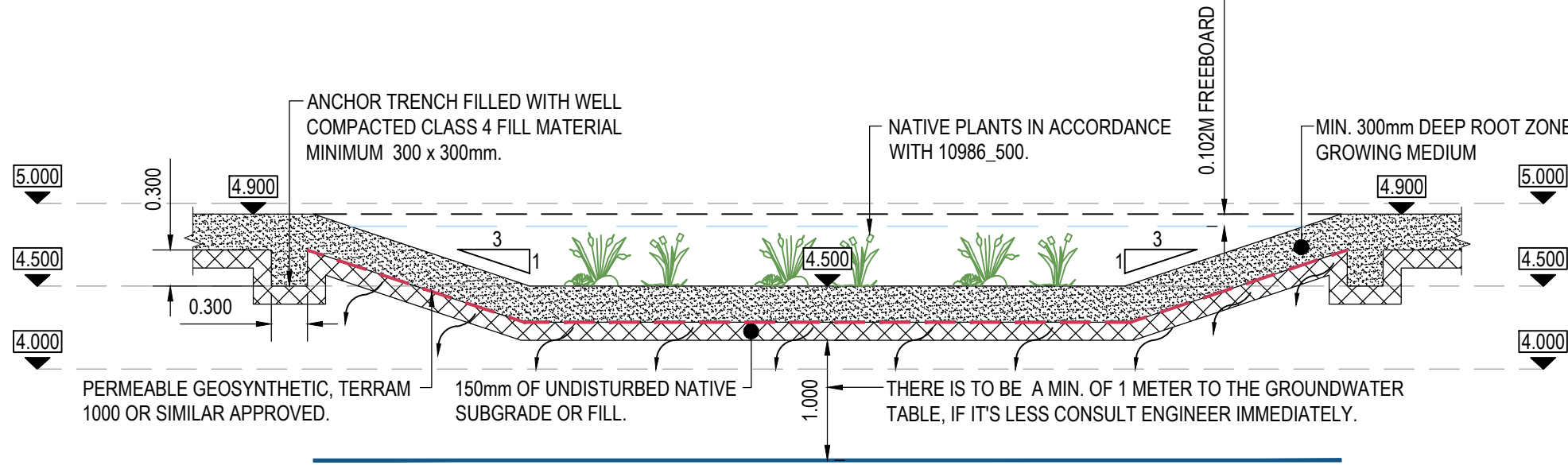


TYPICAL DRAINAGE DETAIL IN CLOSE PROXIMITY OF FOUNDATIONS
(DETAIL IN ACCORDANCE WITH SFA FIGURE B1)



SuDS RAINGARDEN CONSTRUCTION DETAIL

SCALE 1:20



SECTION THROUGH DETENTION BASIN

SCALE 1:50

GENERAL NOTES:

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FOR DRAINAGE PLAN PLEASE SEE DRG. 10986_500.

ADDITIONAL NOTES:

- MH COVERS AND FRAMES TO CONFORM TO BS EN 124: -HIGHWAYS AND FOOTWAYS TO FRONT OF BUILDINGS (D400) -FOOTWAYS TO REAR OF BUILDINGS (C250)
- TYPE S BEDDING AND SURROUND TO ALL PIPES EXCEPT IN THE FOLLOWING CIRCUMSTANCES, IN WHICH TYPE Z BEDDING AND SURROUND ARE TO BE USED: -DOMESTIC GARDENS AND PATHWAYS WITHOUT ANY POSSIBILITY OF VEHICULAR ACCESS, 0.35m; -DOMESTIC DRIVEWAYS, PARKING AREAS AND YARDS WITH HEIGHT RESTRICTIONS TO PREVENT ENTRY BY VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 0.5m; -DOMESTIC DRIVEWAYS, PARKING AREAS AND NARROW STREETS WITHOUT FOOTWAYS (E.G. MEWS DEVELOPMENT) WITH LIMITED ACCESS FOR VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 0.9m; -AGRICULTURAL LAND AND PUBLIC OPEN SPACE, 0.9m; -HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS TO VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 1.2m.
- ALL EXISTING MANHOLE INVERTS TO BE CHECKED AND REPORTED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF DRAINAGE WORKS. EXISTING PIPE CONNECTIONS ARE TO BE CCTV SURVEYED AND INSPECTED BY THE ENGINEER AND LOCAL AUTHORITY. IF THE PIPE CONNECTION IS FOUND TO BE DAMAGED OR IN DISTRESS, THE CONTRACTOR IS TO CARRY OUT REMEDIAL WORKS OR PROVIDE A NEW CONNECTION TO THE EXISTING SEWER (PIPE SIZE AND GRADIENT TO BE DETERMINED BY THE ENGINEER).
- THE GRADIENTS INDICATED AGAINST THE DRAIN RUNS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL INSTALL DRAINS TO THE INVERT LEVELS SHOWN FOR EACH MANHOLE OR OTHER INDICATED POSITION.
- ALL PLOT FOUL DRAINAGE TO BE MINIMUM 100mm DIAMETER UNLESS OTHERWISE NOTED.
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- DESIGN RISK ASSESSMENTS AND METHOD STATEMENTS ARE TO BE PROVIDED TO THE PRINCIPLE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY WORKS.

rev.	drawn	chkd.	approved	date	description
04	NRC	FP	MJ	25.01.23	SITE LAYOUT CHANGED
03	NRC	FP	MJ	13.12.22	REVISED TO INCLUDE DETENTION BASIN DETAIL
02	NRC	FP	MJ	08.12.22	REVISED FOR ARCHITECTS COMMENTS
01	NRC	FP	MJ	02.12.22	ISSUED FOR SAB APPROVAL

Client
BAGLAN BOXING CLUB

Project
BAGLAN BOXING CLUB
FENBROOK CLOSE
PORT TALBOT, SA12 7PA

Title
DRAINAGE DETAILS



29 Bocam Park, Old Field Road, Pencoed, Bridgend CF35 5LJ.
Phone: 01656 863794 Email: enquiries@vale-consultancy.co.uk

date	drawn	checked	approved
29.11.22	NRC	FP	MJ
scale @ A1	project no.		
AS SHOWN	10986		
status	drg. no.	rev.	
A	10986_501	04	



GENERAL NOTES:

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2. ALL LEVELS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
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LEGEND

- FLOW EXCEEDANCE ARROW
- CATCHMENT AREA A = 430.6m²
- CATCHMENT AREA B = 34.0m²
- CATCHMENT AREA C = 48.9m²
- SAB BOUNDARY
- SITE BOUNDARY
- GRASS / SOFT LANDSCAPING
- PAVING TO ARCHITECTS REQUIREMENTS
- EXISTING TARMAC
- EXISTING BUILDING

FOR DRAINAGE PLAN & CONSTRUCTION DETAILS PLEASE SEE DRG. 10986_500 & 10986_501, RESPECTIVELY.

ADDITIONAL NOTES:

1. MH COVERS AND FRAMES TO CONFORM TO BS EN 124: -HIGHWAYS AND FOOTWAYS TO FRONT OF BUILDINGS (D400) -FOOTWAYS TO REAR OF BUILDINGS (C250)
2. TYPE S BEDDING AND SURROUND TO ALL PIPES EXCEPT IN THE FOLLOWING CIRCUMSTANCES, IN WHICH TYPE Z BEDDING AND SURROUND ARE TO BE USED: -DOMESTIC GARDENS AND PATHWAYS WITHOUT ANY POSSIBILITY OF VEHICULAR ACCESS, 0.35m; -DOMESTIC DRIVEWAYS, PARKING AREAS AND YARDS WITH HEIGHT RESTRICTIONS TO PREVENT ENTRY BY VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 0.5m; -DOMESTIC DRIVEWAYS, PARKING AREAS AND NARROW STREETS WITHOUT FOOTWAYS (E.G. MEWS DEVELOPMENT) WITH LIMITED ACCESS FOR VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 0.9m; -AGRICULTURAL LAND AND PUBLIC OPEN SPACE, 0.9m; -HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS TO VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 1.2m.
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4. THE GRADIENTS INDICATED AGAINST THE DRAIN RUNS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL INSTALL DRAINS TO THE INVERT LEVELS SHOWN FOR EACH MANHOLE OR OTHER INDICATED POSITION.
5. ALL PLOT FOUL DRAINAGE TO BE MINIMUM 100mm DIAMETER UNLESS OTHERWISE NOTED.
6. ALL ADAPTABLE THERMOPLASTIC STRUCTURED WALL SEWER PIPE SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 13476-1 AND VIS 4-35-01 AND BS EN 13476-2 OR BS EN 13476-3. PIPES SHALL BE BSI KITEMARKED OR HAVE EQUIVALENT THIRD PARTY CERTIFICATION. PIPES LESS THAN OR EQUAL TO 500mm DIA. SHALL HAVE A SHORT-TERM RING STIFFNESS OF NOT LESS THAN 8kN/m² (SN8).
7. ALL JOINTING IN ACCORDANCE WITH MANUFACTURERS TECHNICAL ADVICE & SPECIFICATION.
8. ALL NON ADAPTABLE DRAINAGE TO BE THE STANDARD UPVC 110mm, 160mm DRAINAGE AND MANUFACTURED TO BS-EN 1401 AND BS 4660 UNLESS NOTED OTHERWISE.
9. ALL PERMEABLE PAVING CELLS TO HOUSE LATERAL FIN DRAIN ALONG LOWER EDGE WITH 1500 CONNECTION PIPE.
10. ALL STORM WATER DRAINAGE TO BE A MINIMUM OF 150mm DIAMETER UNLESS OTHERWISE NOTED.
11. SOIL & VENT PIPE LOCATION AND NUMBER TO BE CONFIRMED WITH ARCHITECT.
12. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS DRAWINGS, TOGETHER WITH THEIR LATEST SPECIFICATIONS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER (VALE CONSULTANCY) AS SOON AS POSSIBLE.
13. FIGURED DIMENSIONS ONLY TO BE USED. ANY QUERIES OR DISCREPANCIES TO BE REFERRED TO THE ENGINEER (VALE CONSULTANCY) IMMEDIATELY.
14. PRIOR TO ORDERING ANY MATERIALS THE CONTRACTOR IS TO CONFIRM MANUFACTURER/PIPE MATERIAL AND GRADE PROPOSED WITH WATER AUTHORITY.
15. TEMPORARY WORKS DESIGN BY OTHERS.
16. DESIGN RISK ASSESSMENTS AND METHOD STATEMENTS ARE TO BE PROVIDED TO THE PRINCIPLE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY WORKS.

03	NRC	FP	MJ	02.12.23	REVISED FOR ARCHITECTS COMMENTS
02	NRC	FP	MJ	02.12.22	REVISED FOR ARCHITECTS COMMENTS
01	FP	MJ	02.12.22	05.12.22	ISSUED FOR SAB APPROVAL

rev.	drawn	chkd.	approved	date	description
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Client
BAGLAN BOXING CLUB

Project
BAGLAN BOXING CLUB
FENBROOK CLOSE
PORT TALBOT, SA12 7PA

Title
FLOW EXCEEDANCE
& CATCHMENT AREA PLAN



date	drawn	checked	approved
29.11.22	NRC	FP 02.12.22	MJ 02.12.22

scale @ A1	project no.
1:250	10986

status	drg. no.	rev.
A	10986_502	03

APPENDIX C: Infiltration Test Results

Soakaway Test Results - BRE 365 Digest standards

Site: Baglan Boxing Club

Client: Baglan Boxing Club

Soakaway Test Results - BRE 365 Digest standards			
Trial Pit 01		Date:	26/10/2022
		Performed by:	Vale Consultancy
Dimensions	(m)	Weather:	Overcast
Width	0.4	Topsoil:	Rooted loamy sand
Length	0.8	Superficial soil:	Sandy gravel
Depth of pit	1.0	Comments:	
75% effective depth =	0.75		
25% effective depth =	0.25		

Test No.	Time (min)	Depth (m)			
1	0	0.75	Vp75-25 (m³) = 0.1600 As50 (m²) = 1.52 tp75-25 (hours) = 0.600		
	20	0.47			
	36	0.25			
			f = 0.17544 m/hr f = 4.87E-05 m/s		
2	0	0.75	Vp75-25 (m³) = 0.1600 As50 (m²) = 1.52 tp75-25 (hours) = 0.533		
	20	0.44			
	32	0.25			
			f = 0.19737 m/hr f = 5.48E-05 m/s		
3	0	0.75	Vp75-25 (m³) = 0.1600 As50 (m²) = 1.52 tp75-25 (hours) = 0.700		
	20	0.51			
	40	0.27			
	42	0.25			
			f = 0.15038 m/hr f = 4.18E-05 m/s		
Lowest infiltration rate =		4.18E-05	m/s		

APPENDIX D: Design Calculations

Vale Consultancy		Page 3
29 Bocam Park Old Field Road, Pencoed Bridgend, Glamorgan, CF35 5LJ		
Date 24/01/2023 11:17 File 10986_r02 - Infiltratio...	Designed by Nathan.Crothers Checked by	
Innovyze Source Control 2020.1		

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 274363 191909 SS 74363 91909
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	1.000
Cv (Winter)	1.000
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+30

Time Area Diagram

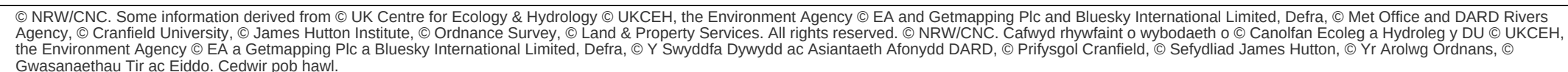
Total Area (ha) 0.051

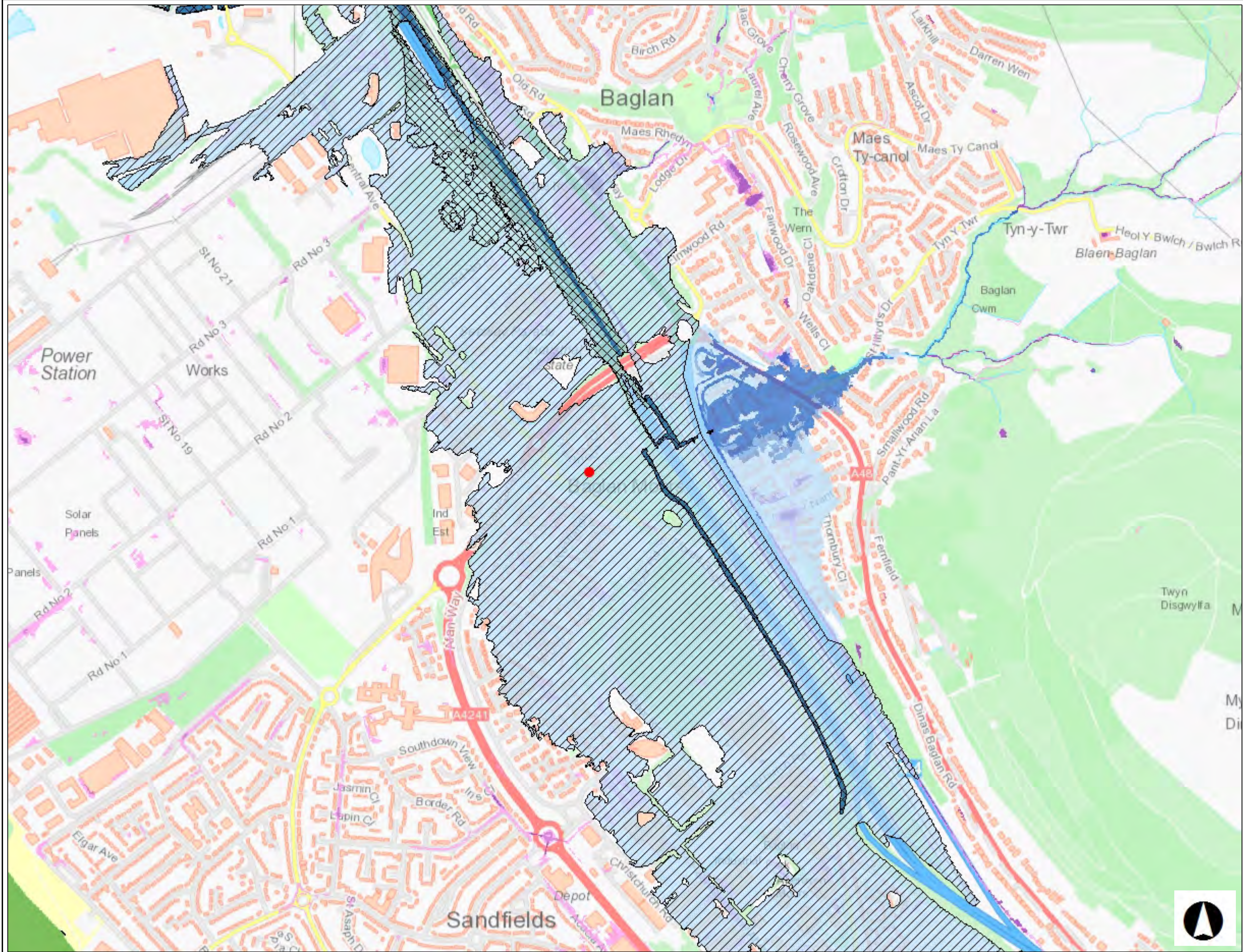
	Time (mins)	Area
From:	To:	(ha)
	0	4 0.051

©1982-2020 Innovyze

Vale Consultancy		Page 4																
29 Bocam Park Old Field Road, Pencoed Bridgend, Glamorgan, CF35 5LJ																		
Date 24/01/2023 11:17 File 10986_r02 - Infiltratio...	Designed by Nathan.Crothers Checked by																	
Innovyze																		
Source Control 2020.1																		
Model Details Storage is Online Cover Level (m) 4.900 Infiltration Basin Structure Invert Level (m) 3.700 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.15048 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.15048 <table><tr><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td></tr><tr><td>0.000</td><td>20.0</td><td>0.800</td><td>20.0</td><td>0.801</td><td>19.4</td><td>1.200</td><td>48.9</td></tr></table> Weir Overflow Control Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 4.900			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	20.0	0.800	20.0	0.801	19.4	1.200	48.9
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)											
0.000	20.0	0.800	20.0	0.801	19.4	1.200	48.9											
©1982-2020 Innovyze																		

APPENDIX E: Natural Resource Wales Development Advice Map & Detailed View Map





Flood Risk Assessment Wales Map - Baglan
Boxing Club, Fenbrook Close, Port Talbot,
SA12 7PA.

Allwedd / Map Key

Areas Benefitting from Flood Defences

-  Rivers
-  Sea
-  Rivers and Sea

Flood Risk from Rivers - Extent

-  High
-  Medium
-  Low

Flood Risk from the Sea

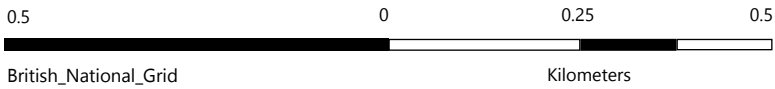
-  High
-  Medium
-  Low

Flood Risk from Surface Water & Small Watercourses - Extent

-  High
-  Medium
-  Low

Graddfa / Scale at A3 1: 10,000

Dyddiad / Date
30/11/2022



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APPENDIX F: Flood Consequence Assessment

Flood Consequences Assessment (FCA) For:

Development at
Baglan Boxing Club
Fenbrook Close
Port Talbot
SA12 7PA

Prepared for:

Baglan Boxing Club

10986 – FCA – R01

24/01/2022

Document Control

Project	Land at Baglan Boxing Club
Client	Baglan Boxing Club
Vale Consultancy Ref:	10986 – FCA - 1

Document Checking:

Prepared By: R Peskett

Signed:



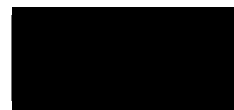
Checked By: S Hardacre

Signed:



Verified By: M Jones

Signed:



Issue	Date	Status
01	24/01/2022	First issue
02		
03		

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1 LIMITATIONS

This FCA is prepared in support of a planning application and is for exclusive benefit of *The Client*. It may not be assigned to or relied upon by third party without the agreement of Vale Consultancy in writing. Vale Consultancy retains all copyright and other intellectual property rights in the document and its contents unless transferred by written agreement between Vale Consultancy and *The Client*.

All comments and proposals contained in this report, including any conclusions, are based on information available to Vale Consultancy during investigations. The conclusions drawn by could therefore differ if the information is found to be inaccurate or misleading. Vale Consultancy accepts no liability should this be the case, nor if additional information exists or becomes available with respect to this scheme.

Except as otherwise requested by the client, Vale Consultancy is not obliged to and disclaims any obligation to update the report for events taking place after: -

The date on which this assessment was undertaken, and the date on which the final report is delivered.

Vale Consultancy makes no representation whatsoever concerning the legal significance of its findings or the legal matters referred to in the following report.

All the Natural Resources Wales (NRW) mapping data used is under special license. Data is current as of **January 2022** and is subject to change.

The information presented and conclusions drawn are based on statistical data and are for guidance purposes only. The study provides no guarantee against flooding of the study site or elsewhere, nor of the absolute accuracy of water levels, flow rates and associated probabilities.

1.1 Purpose of the Report

The purpose of this report is to outline the potential flood risk to the site, the impact of the proposed development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate the identified flood risk. The report has been prepared in accordance with the guidance contained in Planning Policy Wales (PPW) and Technical Advice Note 15 (TAN15): Development and Flood Risk. This report has been prepared in consultation with Natural Resources Wales (NRW).

1.2 Relevant Documents

The FCA has been informed by the following documents:

- Planning Policy Wales Technical Advice Note 15: DEVELOPMENT AND FLOOD RISK;
- Neath Port Talbot County Borough Council Local Flood Risk Management Strategy June 2013
- Neath Port Talbot County Borough Council Flood Risk Management Plan 2015
- Neath Port Talbot Lead Local Flood Authority Preliminary Flood Risk Assessment Report
- Neath Port Talbot County Borough Council Strategic Flood Consequences Assessment (September 2014)
- Neath Port Talbot County Borough Council Local Development Plan (2011-2026) Adopted January 2016

2 INTRODUCTION

Vale Consultancy has been instructed by *The Client* to undertake a Flood Consequences Assessment (FCA) for the proposed extension of an existing building and construction of new access and car parking area at Baglan Boxing Club (*Bulldogs*), Fenbrook Close, Port Talbot, SA12 7PA (274642E, 191961N).

The site currently comprises the existing building which has a footprint of approximately 500m² along with associated access and parking. The frontage (north) of the site is made up of an expansive soft landscaped verge. The total site area as defined by the site boundary is approximately 3261m² or 0.3ha.

Refer to Site Location and Existing Site Plan, Appendix A.

2.1 Site Location

The site is located at the town of Baglan which is approximately 4km north west from Port Talbot and inland from Swansea Bay. The M4 is located approximately 160m north east from the site, with the National Rail Network line further afield which runs parallel to the motorway.

The site is bounded by Fenbrook Close to the north, Port Talbot Cricket Club to the east, Baglan Way Road to the south, and a soft landscaped verge and roundabout to the west. Fenbrook Close provides access to the site.

The wider surrounding land use area comprises a mix of residential and industrial buildings along with some parcels of vacant, undeveloped land. Refer to Figure 1 below.



Figure 1: Site Location Satellite Plan

2.2 Proposed Development

The proposal is for extension of the existing building and construction of new, additional access and parking facilities in the north extent of the site. The proposed extension will result in an additional **150m²** giving the building a footprint of approximately **650m²**. The proposed new hardstanding access and parking facilities is approximately **580m²**.

Refer to Proposed Development Plans, Appendix B.

2.3 Existing Topography

A Topographical Survey to metres Above Ordnance Datum (m AOD) of the site was undertaken by John Vincent Surveys Ltd in June 2020 and has been provided to Vale Consultancy. The survey recorded a minimal level of **5.02m AOD** in the north eastern extent and a maximum level of **5.56m AOD** in the north western extent. A review of the survey data indicates that the site generally slopes from north west to south east. Levels of between **5.05** and **5.32m AOD** are recorded within the existing site access road.

Topographic levels to metres Above Ordnance Datum (m AOD) have also been derived from a 1m resolution NRW composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR data corroborates the Topographical Survey findings. LiDAR data indicates the wider surrounding landscape to be relatively flat.

Refer to Topographical Data, Appendix C.

2.4 Existing Ground Conditions

Reference to the British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site is underlain by Superficial deposits defined as Tidal Flat Deposits comprising clay, silt and sand. Bedrock geology is recorded as South Wales Lower Coal Measures Formation comprising mudstone, siltstone and sandstone.

2.5 Existing Site Drainage

Public sewer records have been obtained from DCWW. A 600mm public combined sewer is recorded just north of the site flowing south west and then north west from manhole SS74916940. Public surface water (SW) sewers are also recorded in the vicinity. Specifically, a 9-inch SW sewer in the east extent of the site flowing south to north until it cojoins with an 18-inch SW sewer at manhole SS74916904 near the site access entrance where it flows north east.

Online internet mapping tools indicate that the site and site access / egress routes are served by formal surface water drainage infrastructure. For instance, there are road gullies and manholes visible.

3 FLOOD ZONE CATEGORY AND POLICY CONTEXT

3.1 Flood Zone Category

The Welsh Government Development Advice Map (DAM) has been developed for land use planning purposes. It is based on Natural Resource Wales' extreme flood outlines and the British Geological Survey drift data. The DAM should be used alongside Planning Policy Wales and Technical Advice Note (TAN) 15 to direct new development with respect to flood risk. Together, they form a precautionary framework to guide planning applications.

In addition to the DAM, the Flood Risk Assessment Wales map indicates long term risk of flooding from Rivers, the Sea, Surface Water and Small Watercourses and Reservoirs.

The DAM excerpt for the site (See Appendix D) shows that the site falls within Zone C1 which is defined by TAN15 as;

Zone C1 – Areas of the floodplain which are developed and served by significant infrastructure, including flood defences

And;

Used to indicate that development can take place subject to application of justification test, including acceptability of consequences

The NRW Flood Risk Maps included in Appendix D show that the site is at '**Low**' risk of flooding from fluvial flooding, meaning it has between 1 in 1000 (0.1%) and 1 in 100 (1%) annual probability of (fluvial) flooding. Furthermore, the site is shown to be served and benefitting from fluvial flood defences.

From the Sea (tidal flooding), the site is shown to be outside of the flood extent and therefore at '**Very Low**' risk of flooding, meaning it has less than 1 in 1000 (0.1%) annual probability of (tidal) flooding.

Refer to Appendix D.

3.2 Development Vulnerability Classification

The proposal is for extension of the existing building and construction of new, additional access and parking facilities in the north extent of the site.

The proposed development is considered to be both '*highly vulnerable development*' (the Boxing Club) and '*less vulnerable*' (car parks / access) in accordance with Figure 2 of the Welsh Government's TAN15.

Paragraph 6.2 of TAN 15 states that highly vulnerable development should be permitted in Flood Zone C1, subject to the justification test and acceptability of consequences:

6.2 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. In zone C the tests outlined in sections 6 and 7 will be applied, recognising, however, that highly vulnerable development and Emergency Services in zone C2 should not be permitted. All other new development should only be permitted within zones C1 and C2 if determined by the planning authority to be justified in that location. Development, including transport infrastructure, will only be justified if it can be demonstrated that: -

- 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,

- i. *It concurs with the aims of PPW and meets the definition of previously developed land (PPW fig 2.1); and,*
- ii. *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.*

Paragraph 7.1 of TAN 15 states that:

If a development proposal in zone C1, or in C2 if it is defined as being of low vulnerability, meets the test outlined in section 6, the justification will be in the knowledge that those development will flood and will need to be planned accordingly.

Local Policy

The Neath Port Talbot County Borough Council Local Development Plan (2011-2026) was adopted in January 2016 and now forms the development plan that will form the basis of decisions on land use for planning in the area. The following policies relate to flood risk and drainage:

Climate Change

3.0.2 Strategic Policy SP1 Climate Change

1. Likely increased food risk will be taken into account and addressed by ensuring that there is greater resilience by avoiding development on land that is at risk from flooding in the first instance in accordance with the sequential approach set out in national guidance or in locations that could increase the risk of flooding elsewhere;

3.0.5 New developments will be expected to avoid unnecessary food risk and to meet the requirements of TAN 15: Development and Flood Risk. No highly vulnerable development will be permitted within Development Advice Map (DAM) Zone C2(8) and development will only be considered in areas at risk of flooding where it can be demonstrated that the site can comply with the justification and assessment requirements set out in the TAN.

5.5.8 Policy BE1 Design

9. Its drainage systems are designed to limit surface water run-off and food risk and prevent pollution;

5.5.13 Drainage systems should be designed to ensure that developments have no detrimental effects on the water environment or on food risk. Normally this will involve the use of Sustainable Drainage Systems (SuDS) techniques.

3.3 Consultation

Product 5 and Product 6 data from the ***Port Talbot Harbourside Flood Model*** undertaken by JBA in 2017 has been reviewed as part of this FCA. To review flood risk, JBA Consulting undertook a hydraulic modelling analysis for the Afon Afan, Ffrwd Wyllt and Baglan Brook watercourses, updating an existing 1D-2D ESTRY-TUFLOW model. To provide robust information on the nature of flood risk from the watercourses, the model was built to enable the simulation of both fluvial and tidal events.

The relevant modelled data outputs have been interrogated and scrutinised by Vale Consultancy as part of this FCA thus enabling the fluvial and tidal flood risk to the site to be analysed quantitatively and in a risk-based manner.

Product 6 modelled data outputs (by JBA) have been provided in **Appendix D**.

4 SOURCES OF FLOODING AND PROBABILITY

4.1 Fluvial

The nearest watercourse is Baglan Brook which is located approximately 35m east from the site at its nearest point, flowing north west until it discharges into the River Neath at approximately 273197E, 193286N). This in turn discharges into Baglan Bay.

The River Afan is located approximately 2.5km south east from the site.

The NRW Flood Risk Map confirms that the site is at *Low Risk* of fluvial flooding – an area considered to have between a 0.1% (1 in 1000) and 1% (1 in 100) annual probability of fluvial flooding.

Formal NRW defences are found throughout the catchment area in the form of embankments, walls and regions of high ground.

The Map shows that the site falls within an area served by fluvial flood protection. A review of GIS shapefiles from the NRW *Lle Portal* indicates these to NRW managed assets in the form of flood walls and embankments.

The NRW 'Historic Flood Map' indicates no records of flooding at the site or within the vicinity.

NRW Flood Data

From a review of the NRW Product 5 and Product 6 data it can be ascertained that the site remains flood-free during all events up to and including the Defended 0.1% AEP fluvial flood event plus 25% Climate Change (CC). The site is shown to be flood-free during all the modelled outputs.

Therefore, it is concluded that the site fully complies with section **A1.14** and **A1.15** of TAN15.

Refer to the Mapped Model Outputs, Appendix D.

It can be concluded that the fluvial flood risk to the site is Low.

4.2 Tidal

The NRW Flood Risk from the Sea Map indicates that the site is outside of the flood extent and therefore at *very low* risk from tidal flooding. A review of Product 5 and Product 6 modelled data shows the site to be flood-free in all of the extreme events. The site is not shown to flood in any of the modelled outputs / events.

Therefore, it is concluded that the site is at very low risk from tidal flooding and fully complies with TAN15.

4.3 Surface Water

Surface water flooding occurs when rainwater does not drain away through the normal drainage system or soak into the ground. It is usually associated with high intensity rainfall events but can also occur with lower intensity rainfall or melting snow where the ground is saturated, frozen or developed, resulting in overland flow and ponding in depressions in topography. Surface water flooding can occur anywhere without warning. However, flow paths can be determined by consideration of contours and relative levels.

The NRW 'Risk of Flooding from Surface Water' map (**Appendix D**) indicates the extent of flood risk from surface water and small watercourses. An extract is provided below for reference.



Figure 2: Extract of NRW surface water and small watercourses flood risk map

The flood map shows that the site and wider surrounding area are outside of the flood extent and therefore at **very low** risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding.

There are no records of surface water flooding at the site.

The proposed development will incorporate a Sustainable Drainage System (SuDS) resulting in the improvement of the sites existing surface water drainage arrangement.

It can be concluded that the site is at **very low** risk of surface water flooding.

4.4 Sewer Flooding

Flooding from sewers can occur when a sewer is overwhelmed by heavy rainfall, becomes blocked, is damaged, or is of inadequate capacity.

There are no known records of notable flooding from sewers at the site or in the near vicinity.

It can be concluded that the risk of sewer flooding is low.

4.5 Groundwater Flooding

Groundwater flooding occurs when water levels underneath the ground rise above normal levels. Prolonged heavy rainfall soaks into the ground and can cause the ground to become saturated. This results in rising groundwater levels which leads to flooding above ground.

There are no known records of groundwater flooding incidents at or near to the site. Furthermore, the site is currently overlain by 100% hardstanding which would prevent the ingress of groundwater to the surface.

It can be concluded that the risk of groundwater flooding is low.

4.6 Artificial Sources of Flooding

There are no canals or other artificial / man-made surface water features in the vicinity.

The NRW 'Risk of Flooding from Reservoirs' map (**Appendix D**) shows that the site is not at risk of flooding from reservoirs.

All large reservoirs must be inspected and supervised by a reservoir panel engineer, as the enforcement agency the NRW ensure that reservoirs are inspected regularly, and essential safety work carried out.

It can be concluded that the probability of flooding from artificial sources is very low.

4.7 Summary of Potential Flooding

It can be concluded that fluvial and tidal flooding are the main potential source of flood risk to the site.

There are no records of historic flooding at the site.

The proposed development will incorporate a Sustainable Drainage System (SuDS) resulting in the improvement of the sites existing surface water drainage arrangement.

All other potential sources of flooding have been assessed and are concluded to be low.

The risk of flooding to the development proposal has been addressed and a balanced judgement has been applied in recognising the important benefits of using previously developed land in realising the development expectations.

5 TAN15 ASSESSMENT

5.1 Justifying the Location

TAN15 advises that all new developments should only be permitted within Zones C1 if determined by the planning authority to be justified in the relevant location. Development, including transport infrastructure, should only be considered justified if it can be demonstrated that:

- Its location in Zone C is necessary to assist, or be part of the local authority regeneration initiative or a local authority strategy required to sustain an existing settlement or region; or
- 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
- It concurs with the aims of Planning Policy Wales 2002 and meets the definition of previously developed land; and
- The potential consequences of a flooding event for the development have been considered, and found to be acceptable.

In both these instances it is necessary that the development concurs with PPW and meets the definition of previously developed land. The potential consequences of a flooding event must be considered, and in terms of criteria identified in TAN 15 found to be acceptable.

The proposed development will provide, enhance and extend an important community service on what is currently undeveloped land.

The following statement from TAN15 is deemed to be of particular relevance to this specific development proposal:

“Much urban development in Wales has taken place alongside rivers and in the coastal plain. It is therefore inevitable, despite the overall aim to avoid flood risk areas, that some existing development will be vulnerable to flooding and fall within zone C. Some flexibility is necessary to enable the risks of flooding to be addressed whilst recognising the negative economic and social consequences if policy were to preclude investment in existing urban areas, and the benefits of reusing previously developed land”

It is ascertained that the development concurs with the aims of PPW.

The potential consequences of flooding, to satisfy the latter part of these conditions, are assessed in terms of the requirements of TAN 15 in the following sections of the report.

5.2 Compliance

As previously mentioned, the site and proposed development fully comply with section **A1.14** and **A1.15** of TAN15.

6 MITIGATION & RECOMENDATIONS

The site is deemed to be at either very low or low risk from all of the potential sources assessed.

Taking a precautionary approach and as an additional factor of safety, mitigation measures could be incorporated into the proposed development. The ground floor FFL should be at least 150mm above surrounding ground levels in accordance with Building Regulations.

Additional internal alterations that should be introduced where practically possible to the development include:

- Raised electronic control units and sockets.
- Install smart air bricks or air brick covers.
- Provide low level flood guards on all access points.
- Use plastic and stainless-steel fixtures and fittings and avoid wooden alternatives.
- Use solid flooring (tiled, resin, concrete) at lower ground level, where possible.
- Ensure that with the time afforded by advance warning, evacuation of property via safe egress and removal of valuables from the building can be implemented.
- Clearance of the existing surface water drainage system to improve drainage of the site and follow necessary maintenance procedures (to new & existing SW drainage) to ensure that the system functions to optimum capacity.
- The predicted depths, rise, speed of inundation and velocities are likely to satisfy the TAN 15 suggested tolerable conditions for more extreme events.
- Use robust flood resistant construction techniques as detailed the RIBA publication -
- “Improving the Flood Performance of New Buildings, Flood Resilient Construction” (May 2007).

Flood Alerts and Flood Warnings cover this area (**see Appendix D**). Site owners should register to receive flood alerts and where possible, Flood Warnings. Flood Warnings Direct is a free service that provides prior warnings of a fluvial flood event. Areas at risk of flooding from rivers (fluvial) and the sea (tidal) are warned, which relies on direct measurements of rainfall, river levels, tide levels, in-house predictive models, rainfall data and information from the Met Office. This service operates 24 hours / day 365 days a year. If flooding is forecast, warnings are issued using a set of easily recognisable codes.

Appropriate documentation should be displayed to inform any users of the site of the potential risk. Documentation will be displayed at an appropriate position in the building. The documentation will indicate the risk of flooding and contain information on how prior warnings will be sent to the building. Further information on the documentation will comprise of the Floodline Warnings Direct telephone number, emergency services numbers and exit plans and egress directions from the hall, as identified in the evacuation procedure for the site.

The site owner should draw up an evacuation procedure for implementation during an extreme event. This should be done in conjunction with the appropriate professional bodies. An evacuation procedure should be drawn up after the developer has completed an action plan. The action plan is carried out and based on an assessment of the consequences of an extreme flood on the building. The extent of 'dry proofing' measures incorporated is determined by the assessment of the social and economic impact of a flood.

The evacuation procedure should be a written document which should outline the course of action to occupants during a flood. The evacuation procedure should address the following topics:

- A list of important contacts, building services, suppliers and evacuation contacts for officers and users.
- A description or plan showing locations of key property, protective materials and service shut-off points.
- Basic strategies for protecting property and assisting recovery.
- Checklist of procedures that can be quickly accessed by users during a flood.
- Safe exit-plan (building and site);
- Safe exit route to higher ground outside the flood risk area (building and site), kept and displayed on site.

Flood proofing measures should be incorporated as far as is practically possible.

It is proposed that the new building will be constructed with materials with inherently good wet proofing performance. Wet proofing is the use of more flood resistant building materials in the floors, walls and doors, i.e., concrete ground slab and masonry wall construction in this case.

6.1 Access and Egress

Safe access / egress is provided by Seaway Parade (A4241) (west and then south west) to a location outside of the extreme flood extent. **Refer to Figure 3 below.**

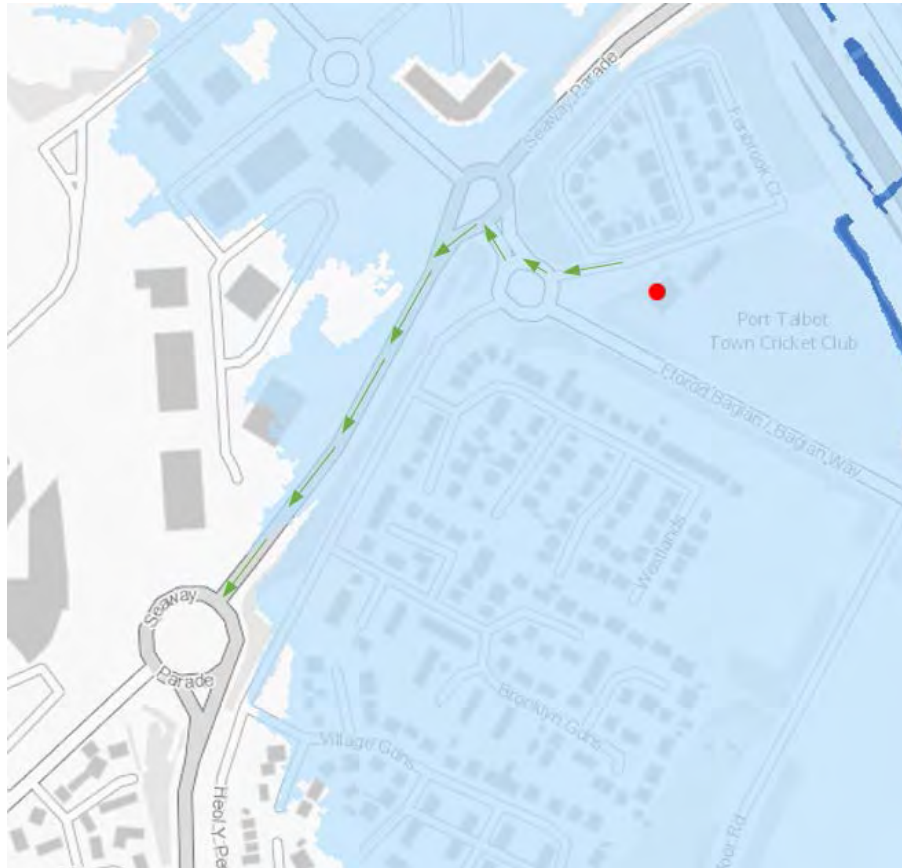


Figure 3: Flood Evacuation / Safe Egress Route

6.2 Safe Refuge Area and Flood Procedure

In the highly unlikely event that the site floods the competent warning authority is the NRW and a lead time of several hours in advance of flooding is provided, excluding potential breaches of defences. When a flood is expected Neath Port Talbot County Borough Council, and the local emergency services will be responsible for public care and safety. In the event of the site flooding before site users have an opportunity to evacuate via the route specified.

7 CONCLUSIONS

The proposal is for extension of the existing building and construction of new, additional access and parking facilities in the north extent of the site. The proposed extension will result in an additional **150m²** giving the building a footprint of approximately **650m²**. The proposed new hardstanding access and parking facilities is approximately **580m²**.

The DAM shows that the site falls within Zone C1, which is defined by TAN15 as:

Zone C1 – Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.

The NRW Flood Risk Maps included in **Appendix D** show that the site is at *Low risk* of fluvial flooding meaning it has between 0.1% and 1% annual probability of flooding.

The site is shown to be at *very low risk* of flooding from the sea meaning it has less than 0.1% chance annual probability of flooding.

The flood map shows that the site and wider surrounding area are outside of the pluvial flood extent and therefore at **very low** risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding.

All other potential sources of flooding have been investigated and are considered to be low.

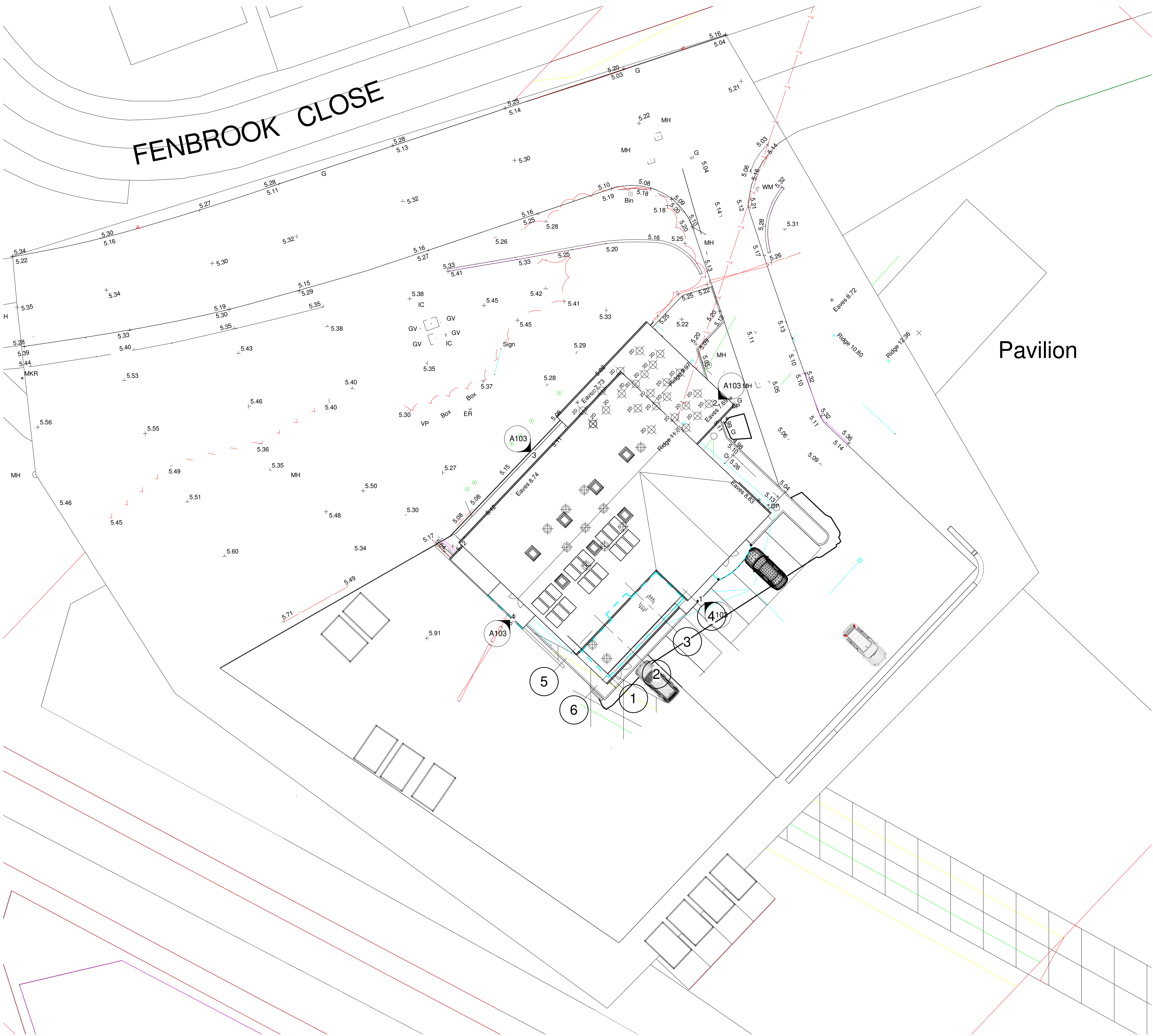
It is concluded that the site and proposed development are fully compliant with PPW and TAN15.

Taking a precautionary approach, the FCA outlines suitable mitigation measures and factors to ensure that the consequences (in the highly unlikely event of flood defences failing and the site flooding) of any potential flooding are totally minimised.

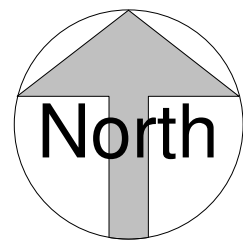
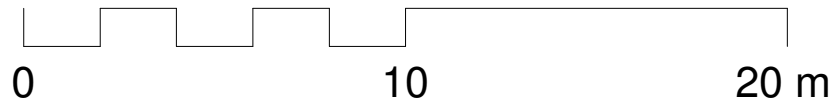
Surface water drainage is to be suitably designed in line with local and national requirements, thus improving the current arrangement.

Therefore, based on the findings of the FCA, it is considered that the principal objectives of TAN15 have been satisfied and that the development proposals are acceptable in terms of flood risk.

APPENDIX A: Site Location and Existing Site Plan



1 Site
1 : 200

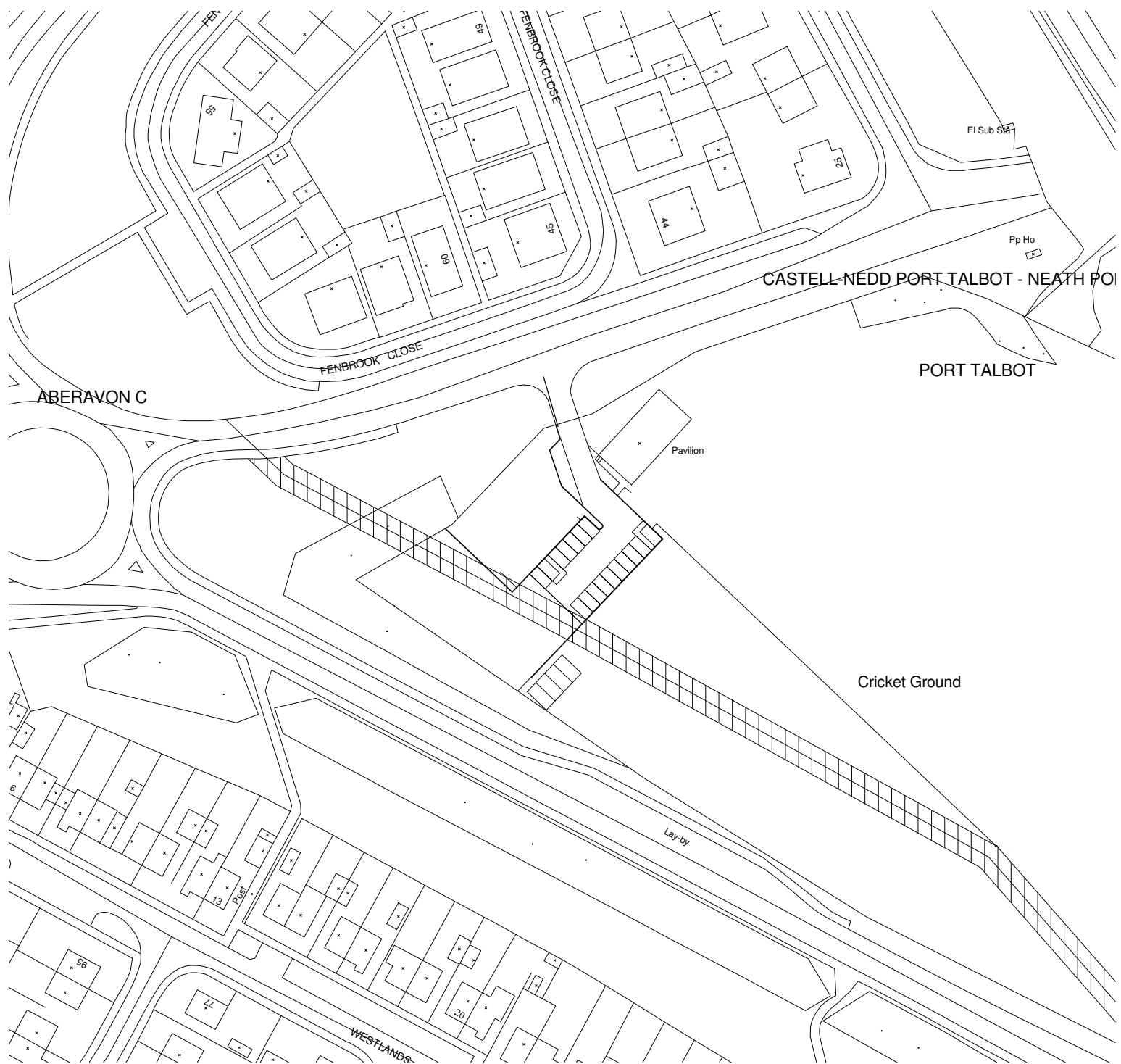


Pavilion

- NOTES
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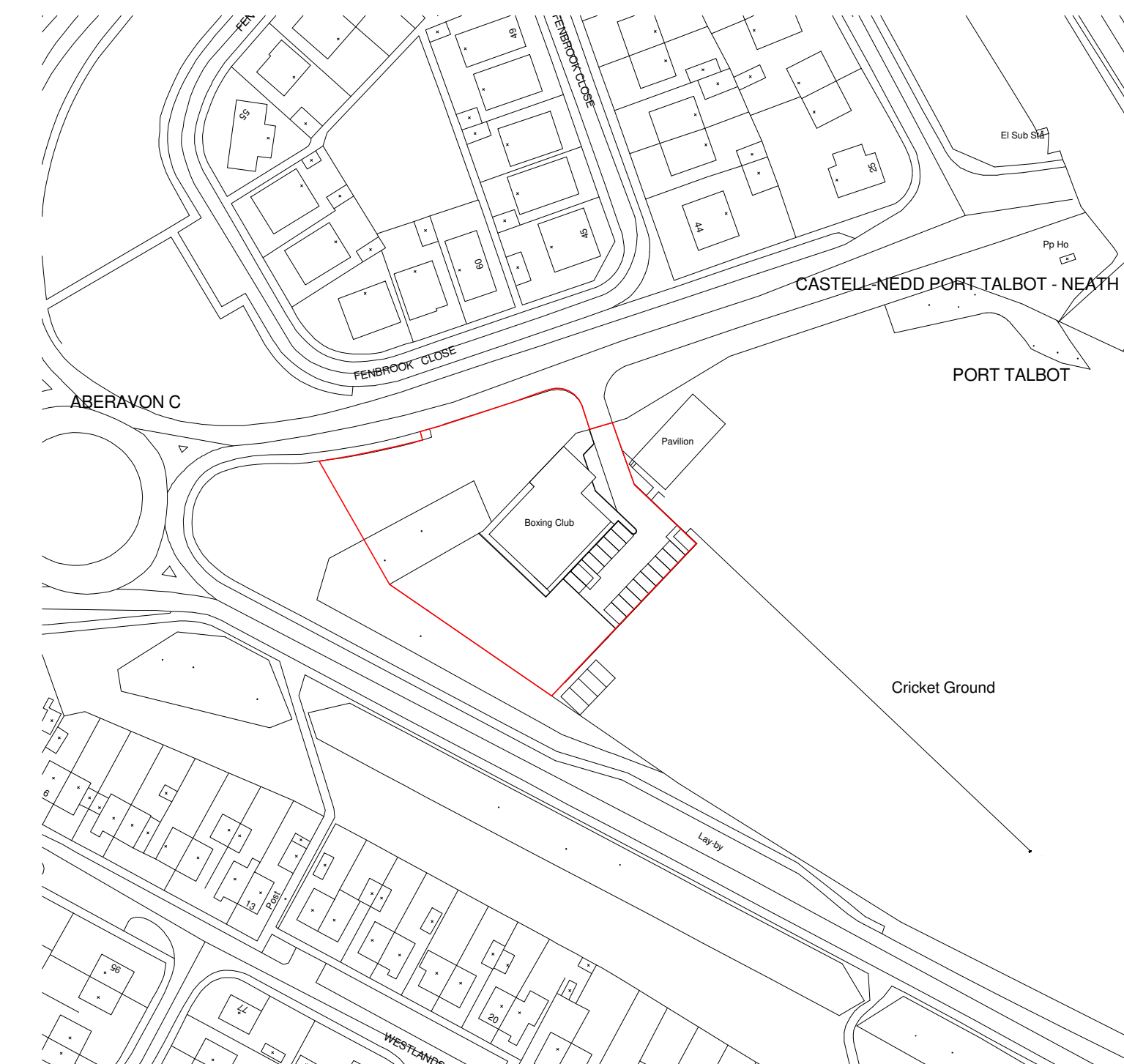
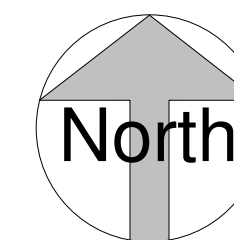
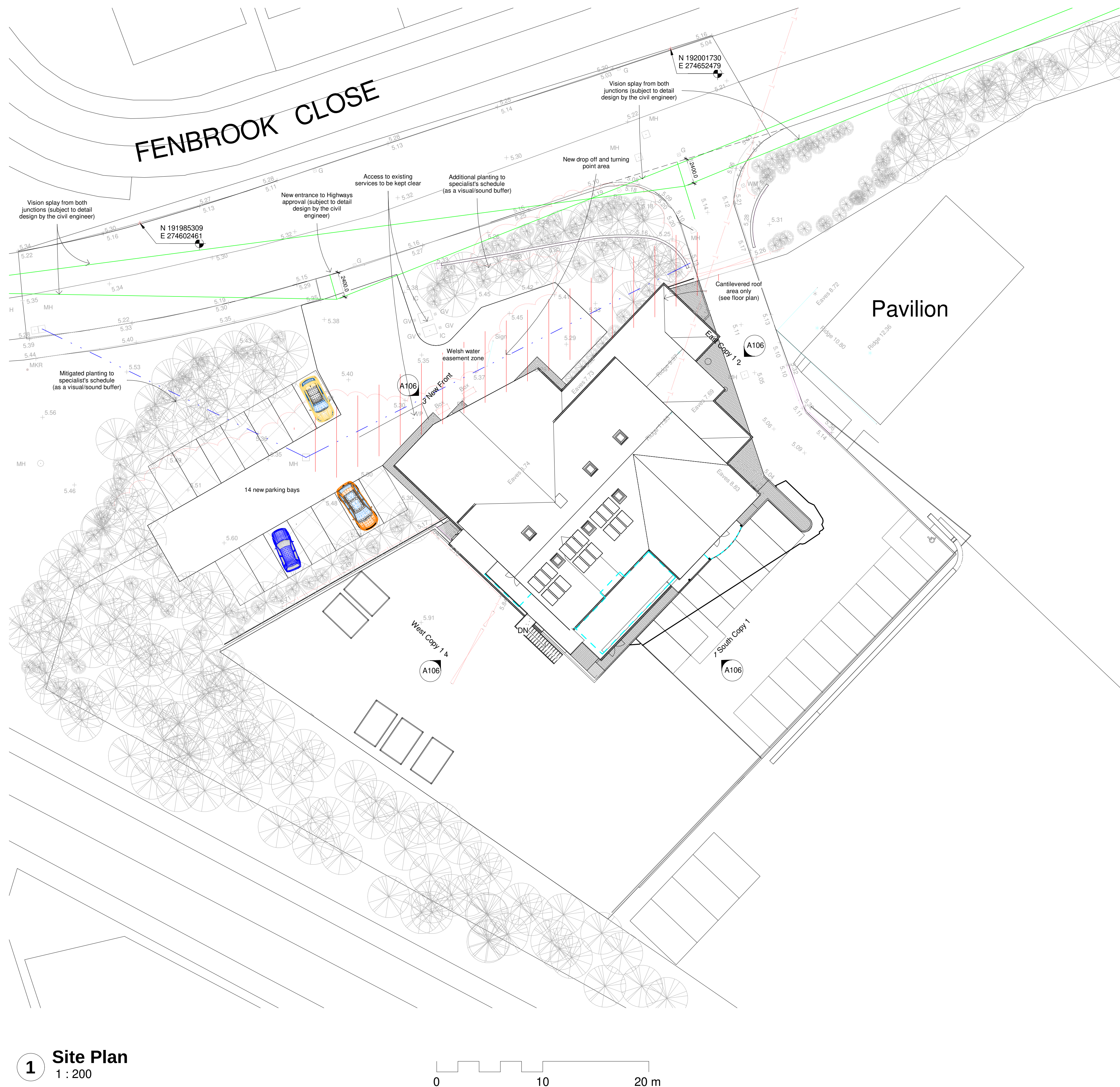
2 Location
1 : 1250

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web: www.360ad.co.uk



APPENDIX B: Proposed Development Plans



- ### NOTES
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[illegible]

PLANNING ONLY

3 New Front

NOTES

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Room Schedule - Proposed

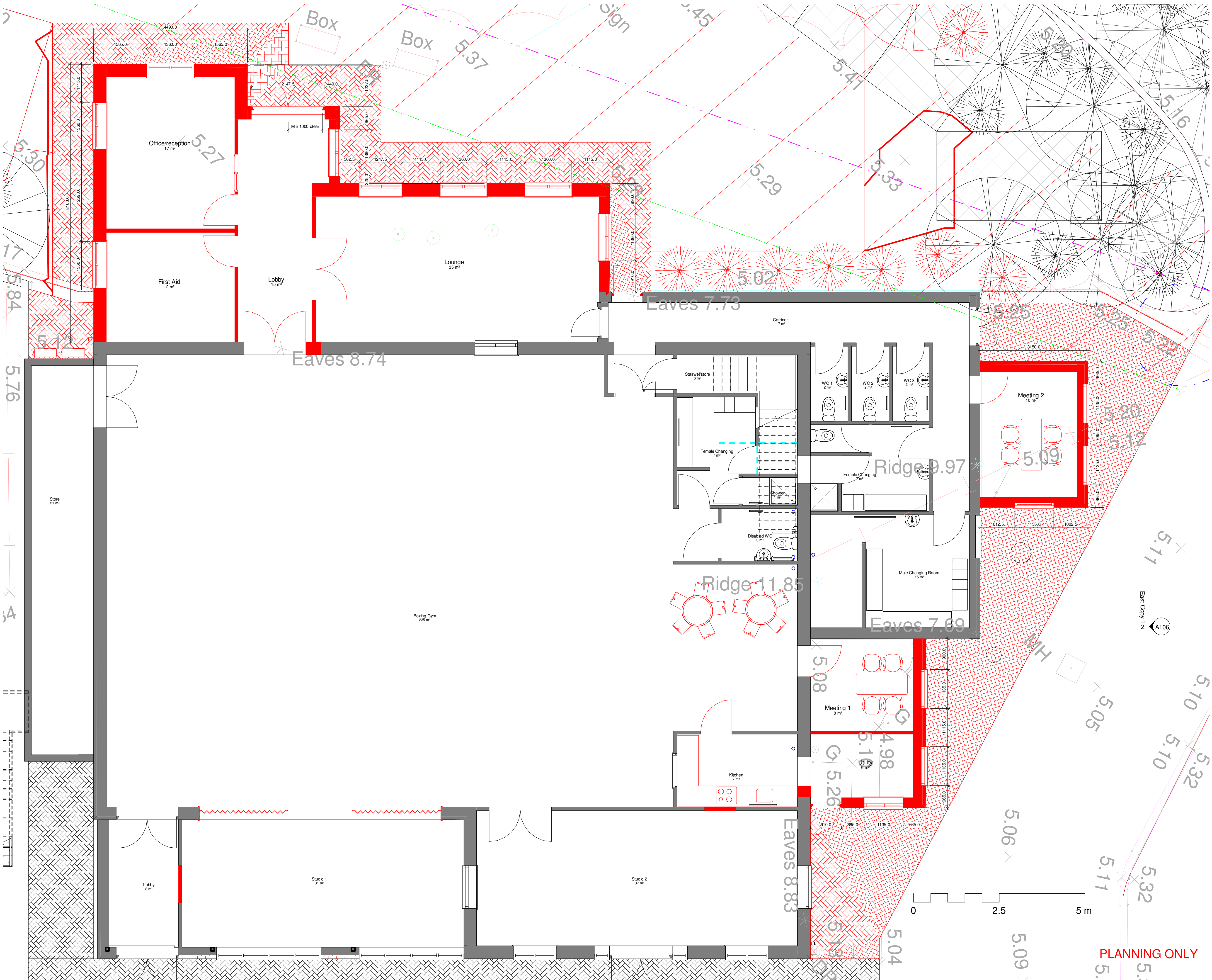
Name	Level	Area	Perimeter
Office/reception	Ground Floor	17 m ²	16345
First Aid	Ground Floor	12 m ²	13890
Lobby	Ground Floor	15 m ²	18320
Lounge	Ground Floor	35 m ²	25030
Meeting 2	Ground Floor	10 m ²	12855
Meeting 1	Ground Floor	8 m ²	11385
Utility	Ground Floor	6 m ²	9700
Boxing Gym	Ground Floor	235 m ²	69267
Studio 2	Ground Floor	37 m ²	26640
Kitchen	Ground Floor	7 m ²	11300
Disabled WC	Ground Floor	3 m ²	7500
Female Changing	Ground Floor	7 m ²	15155
Shower	Ground Floor	1 m ²	4850
Male Changing Room	Ground Floor	15 m ²	20850
Stairwell/store	Ground Floor	6 m ²	12205
Corridor	Ground Floor	17 m ²	33250
Studio 1	Ground Floor	31 m ²	23880
Lobby	Ground Floor	8 m ²	11485
Store	Ground Floor	21 m ²	26345
Female Changing	Ground Floor	7 m ²	13685
WC 3	Ground Floor	2 m ²	6515
WC 1	Ground Floor	2 m ²	6570
WC 2	Ground Floor	2 m ²	6570
Grand total: 23		505 m ²	

rev.	drawn	chkd.	appvd.	date	description
Client					
Baglan Boxing Club Fenbrook Close Port Talbot SA12 7PA					
Project					
New entrance extension					
Title					
Proposed ground floor plan					
360AD Limited Architectural Design & Visualisation Consultancy First floor 29 Bocam Park Pencoed Bridgend CF35 5LJ T: 01656330997 email: enquiries@360ad.co.uk web: www.360ad.co.uk					
date		drawn	checked	approved	
August 2021		ND	ND		
scale @ A1		Project number			
1 : 50		10-026			
status	System Number		drg. no.	rev.	
	20-026-b		A105		



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web: www.360ad.co.uk

date August 2021		drawn ND		checked ND		approved	
scale @ A1		Project number 1 : 5010-026					
status Planning	System Number 20-026-b					drg. no. A105	rev.





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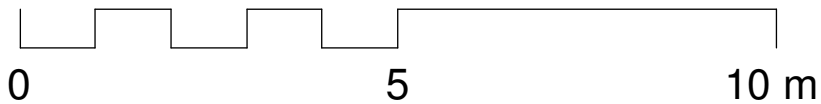
Artist Impression - Front



Artist Impression - Side
1 : 1



Artist Impression - Front 2



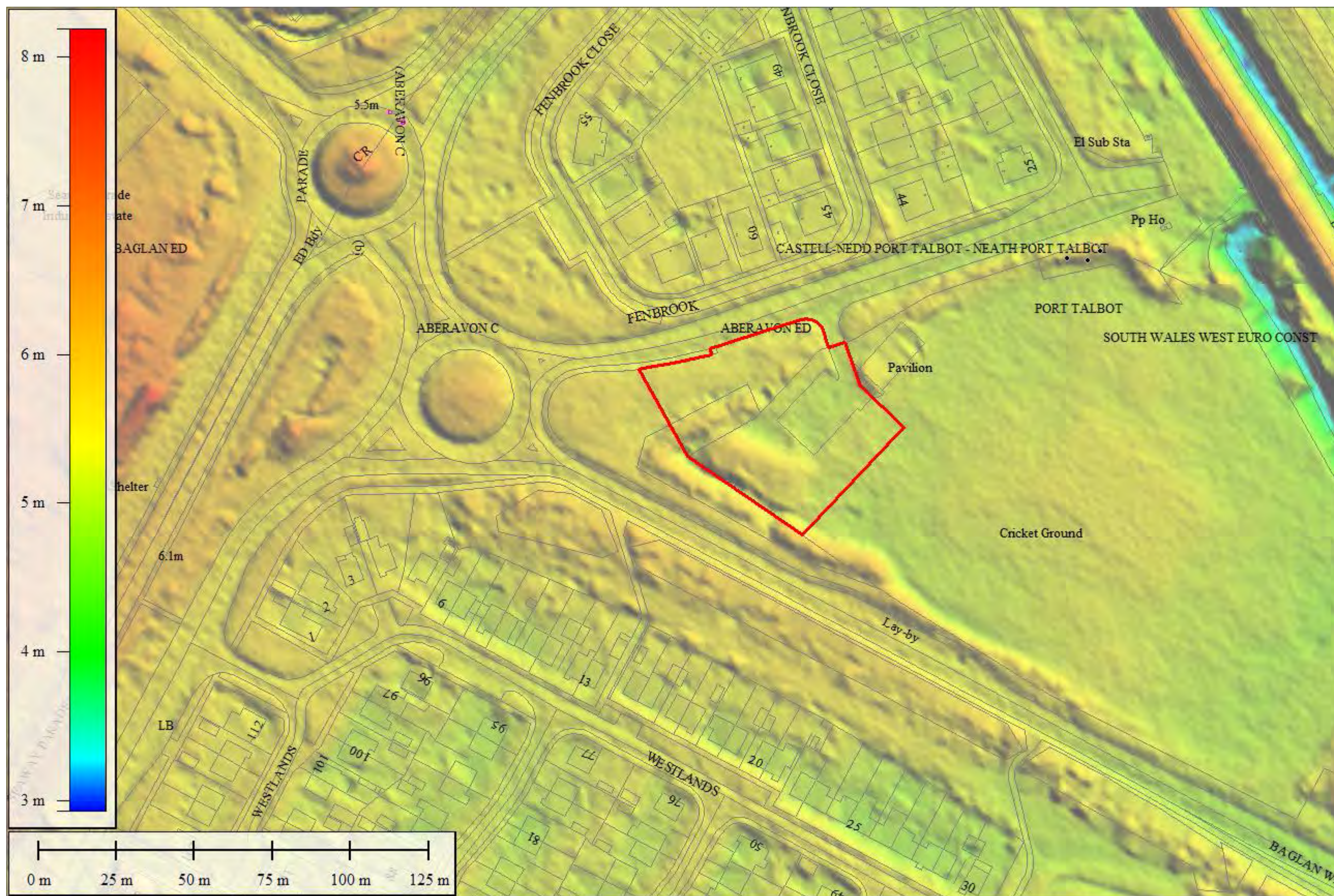
4 West
1 : 100

A	ND	ND		18/10/21	Parking alterations
rev.	dwnn chgd.	apprvd. date			description
Cient Baglan Boxing Club Fenbrook Close Port Talbot SA12 7PA					
Project					
New entrance extension					
Title					
Proposed Elevations					
360AD Limited, Architectural Design & Visualisation Consultancy First floor 29 Bocam Park Pencoed Bridgend CF35 5LJ t: 01896320597 email enquiries@360ad.co.uk web www.360ad.co.uk 					
date	drawn	checked	approved		
August 2021	ND	ND			
scale @ A1		Project number			
As indicated		10-026			
status	System Number			drg. no.	rev.
Planning	20-026-b			A106	A

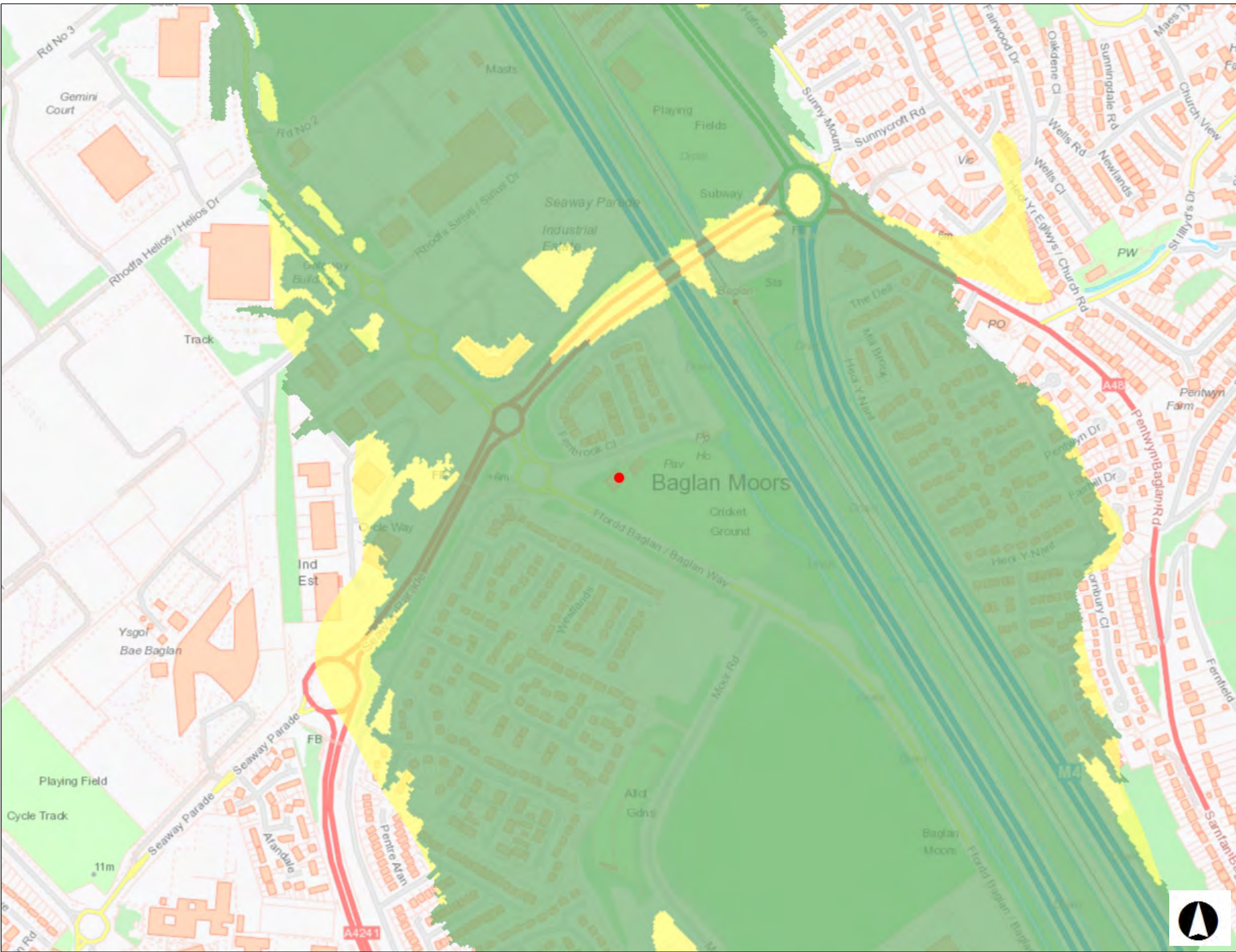
PLANNING ONLY

APPENDIX C: Topographical Data

10986 – Baglan Boxing Club

**NRW LiDAR Extract (m AOD)**

APPENDIX D: NRW Flood Maps & Product 5 / 6 data



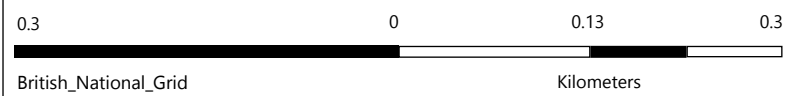
10986 - Baglan Boxing Club

Allwedd / Map Key

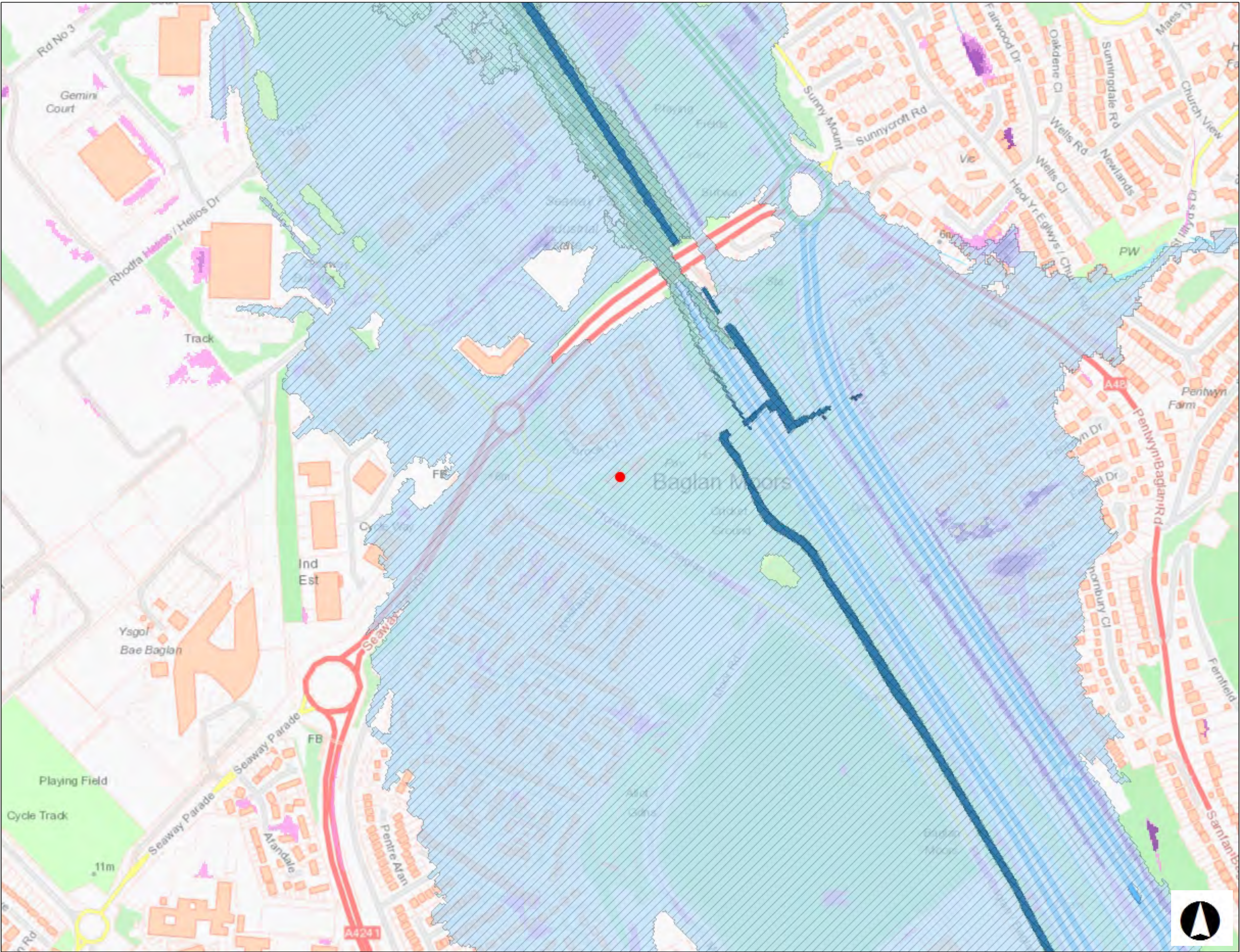
- Zone C1
- Zone C2
- Zone B
- Zone A

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
19/01/2022



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10986 - Baglan Boxing Club

Allwedd / Map Key

Areas Benefitting from Flood Defences

- Rivers
- Sea
- Rivers and Sea

Risk Level Under Review

Flood Risk from Rivers - Extent

- High
- Medium
- Low

Flood Risk from the Sea

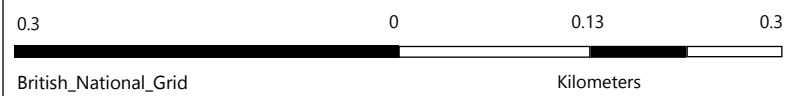
- High
- Medium
- Low

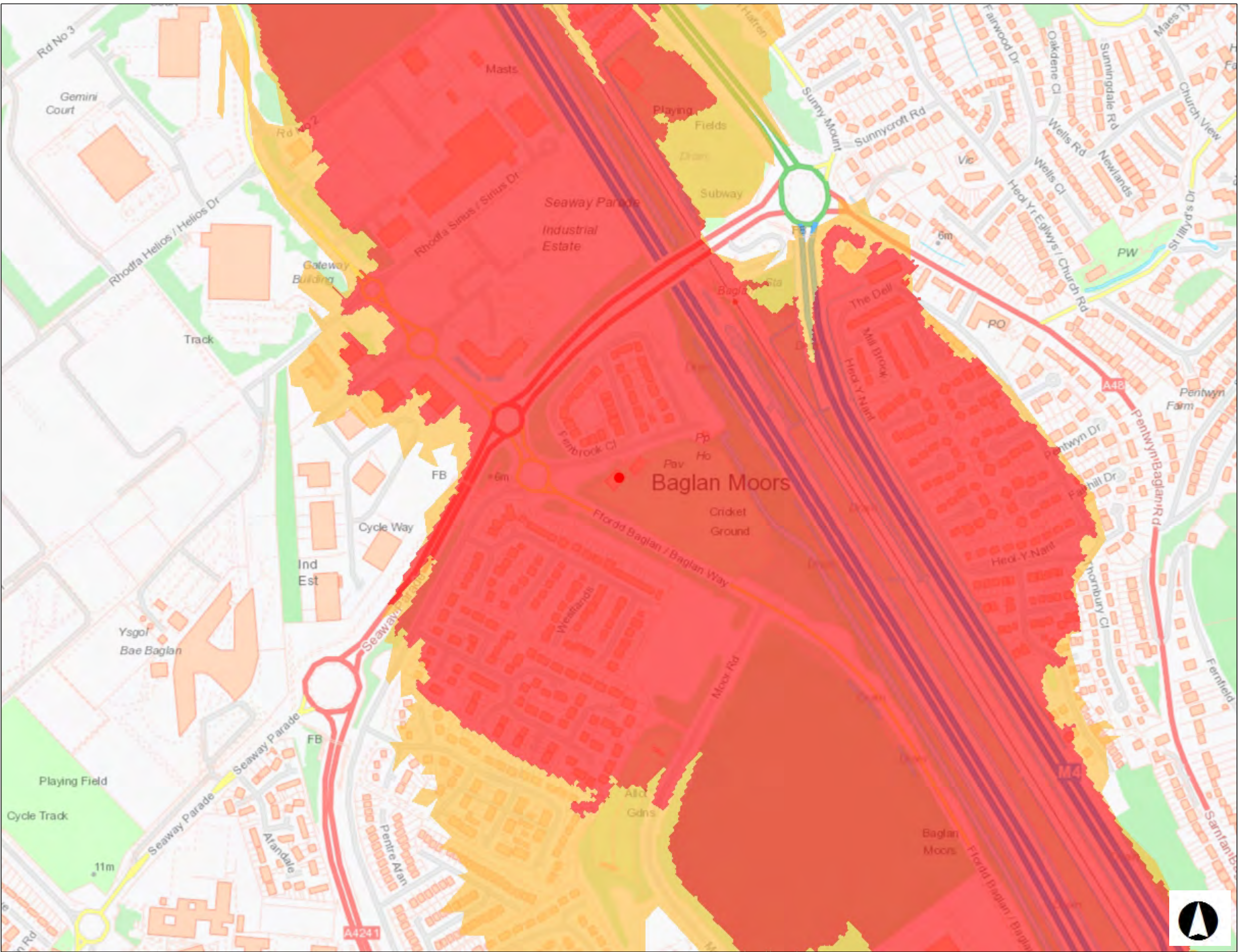
Flood Risk from Surface Water & Small Watercourses - Extent

- High
- Medium
- Low

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
19/01/2022





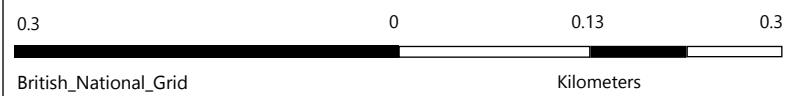
10986 - Baglan Boxing Club

Allwedd / Map Key

- Flood Warning Area
- Flood Alert Area

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
19/01/2022



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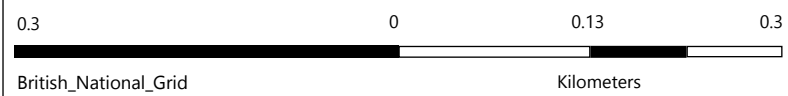
10986 - Baglan Boxing Club

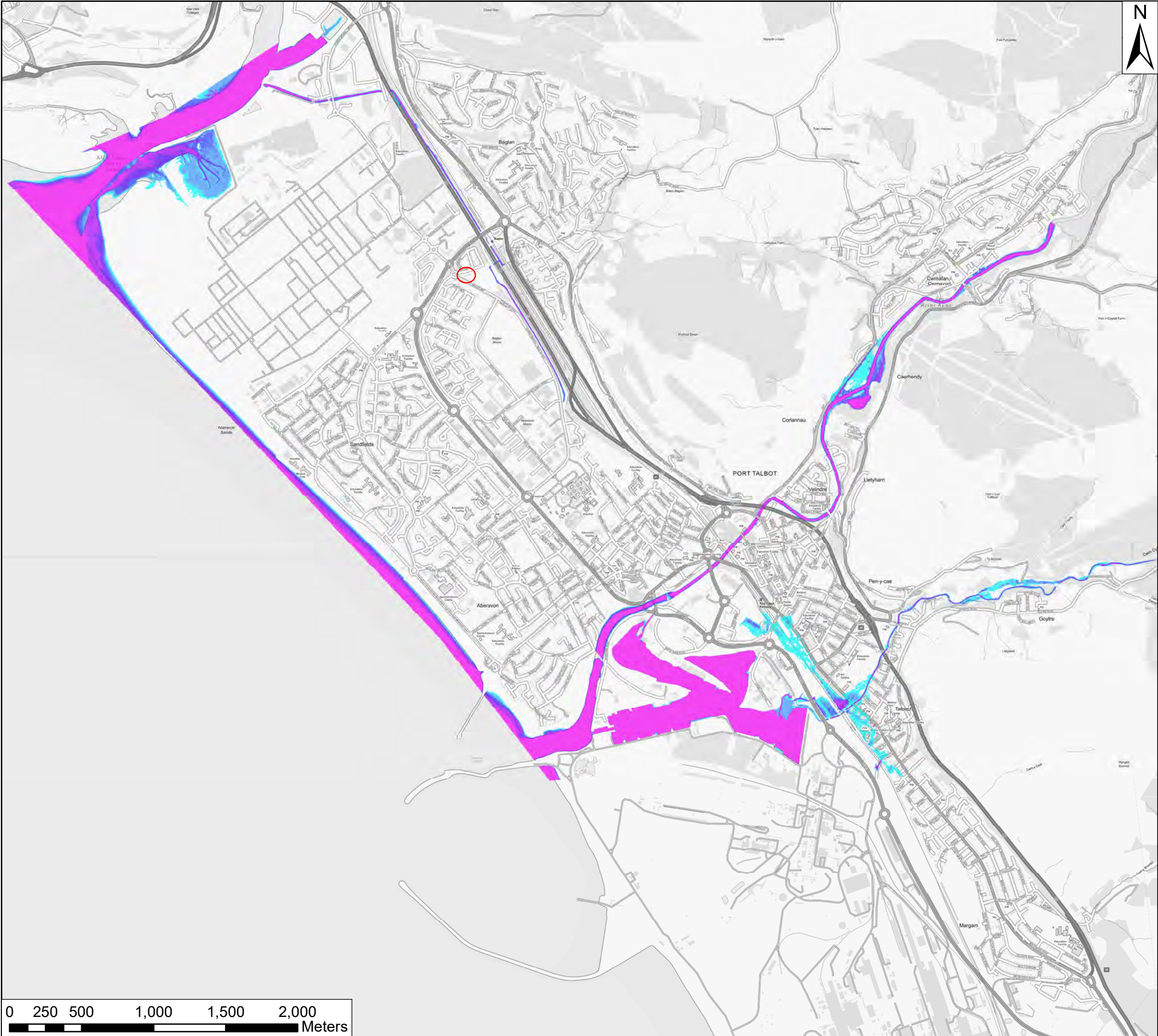
Allwedd / Map Key

-  Recorded Flood Extents
-  Flood Risk from Reservoirs

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
19/01/2022





KEY

Fluvial 1% AEP event

Depth (m)

0 - 0.25

0.25 - 0.5

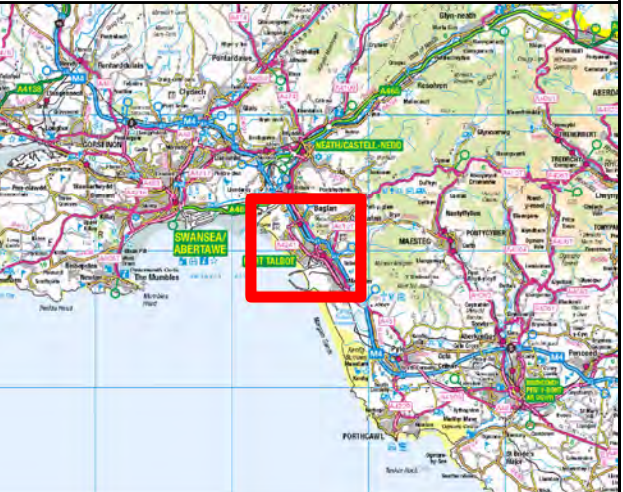
0.5 - 0.75

0.75 - 1

1 - 1.5

1.5 +

KEYPLAN



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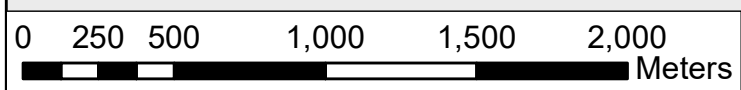
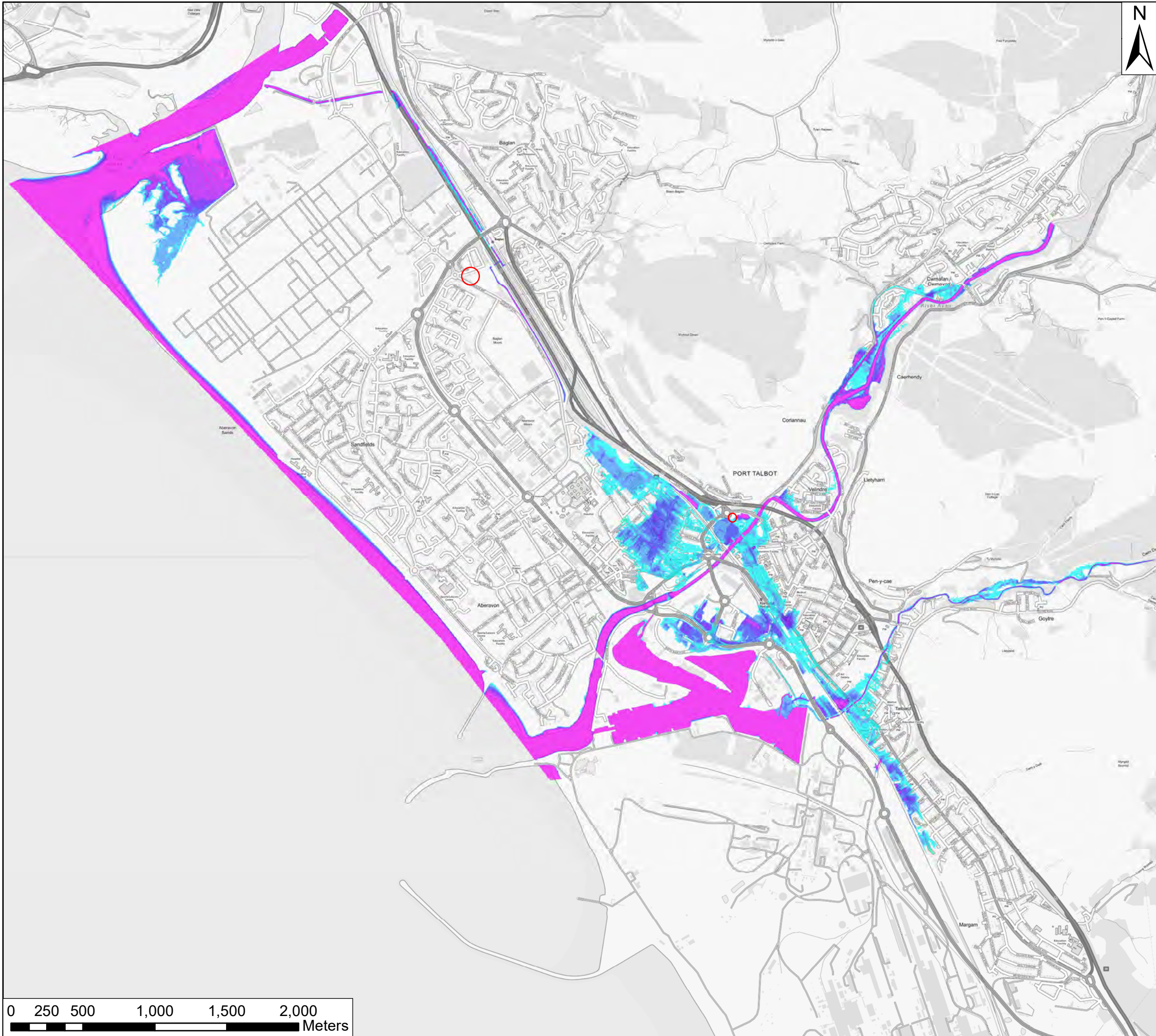
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for

Neath Port Talbot County Borough Council

Port Talbot Harbourside PAR
Fluvial Depth Grid - 1% AEP

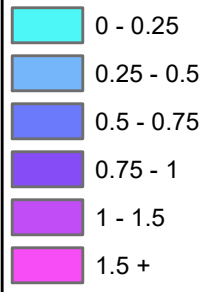
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Drawing 2016s4827_PT_005		Sheet No.: 5 of 16	Rev.: A



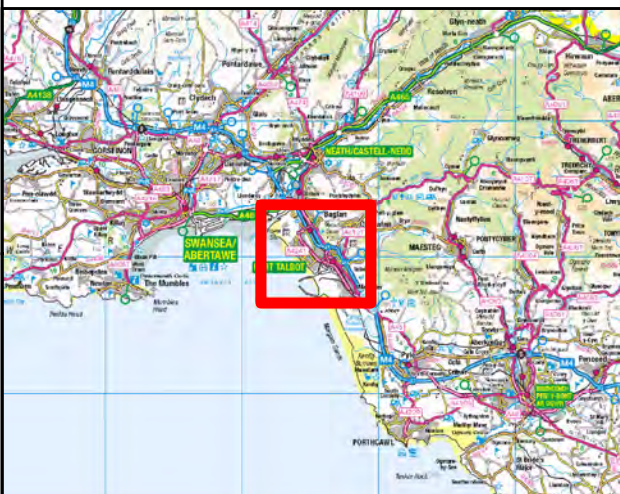
KEY

Fluvial 1% AEP event + climate change

Depth (m)



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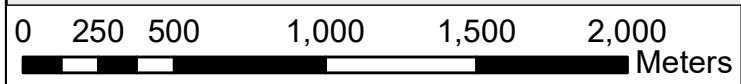
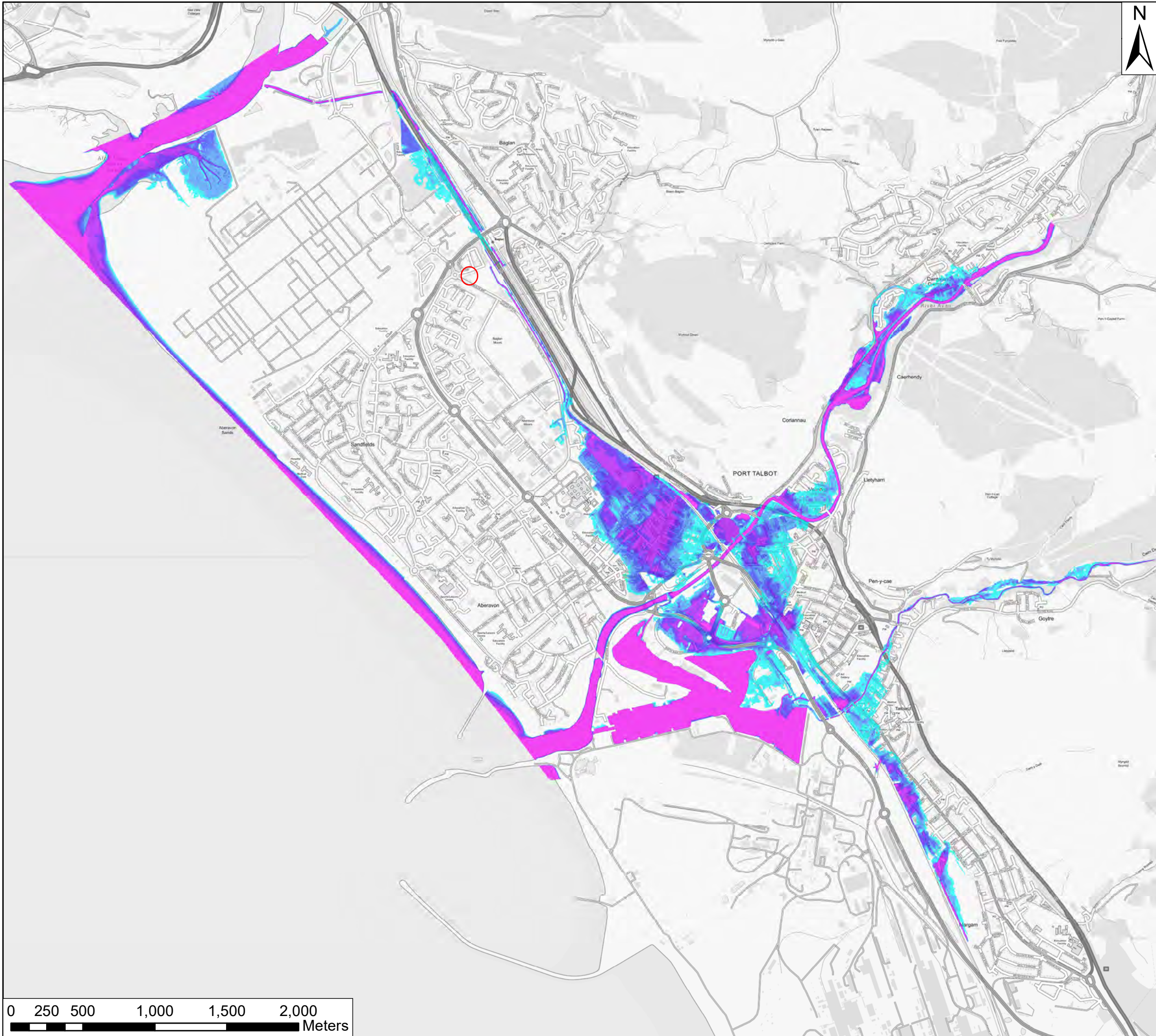


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Borough Council**
Port Talbot Harbourside PAR
Fluvial Depth Grid - 1% AEP
plus Climate Change

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KEY

Fluvial 0.1% AEP event

Depth (m)

0 - 0.25

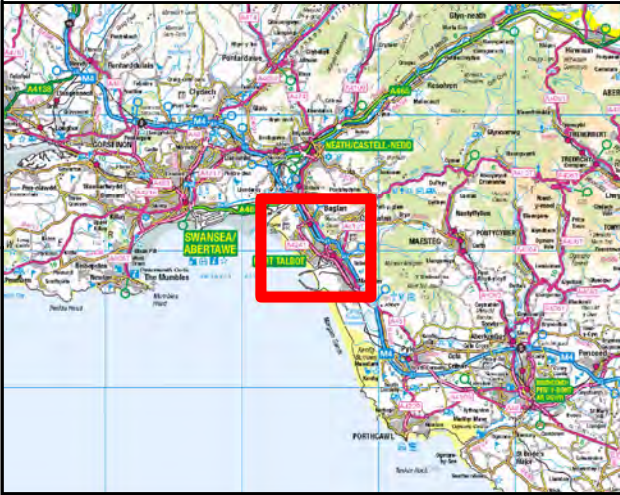
0.25 - 0.5

0.5 - 0.75

0.75 - 1

1 - 1.5

1.5 +

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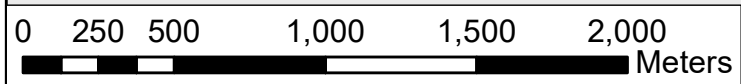
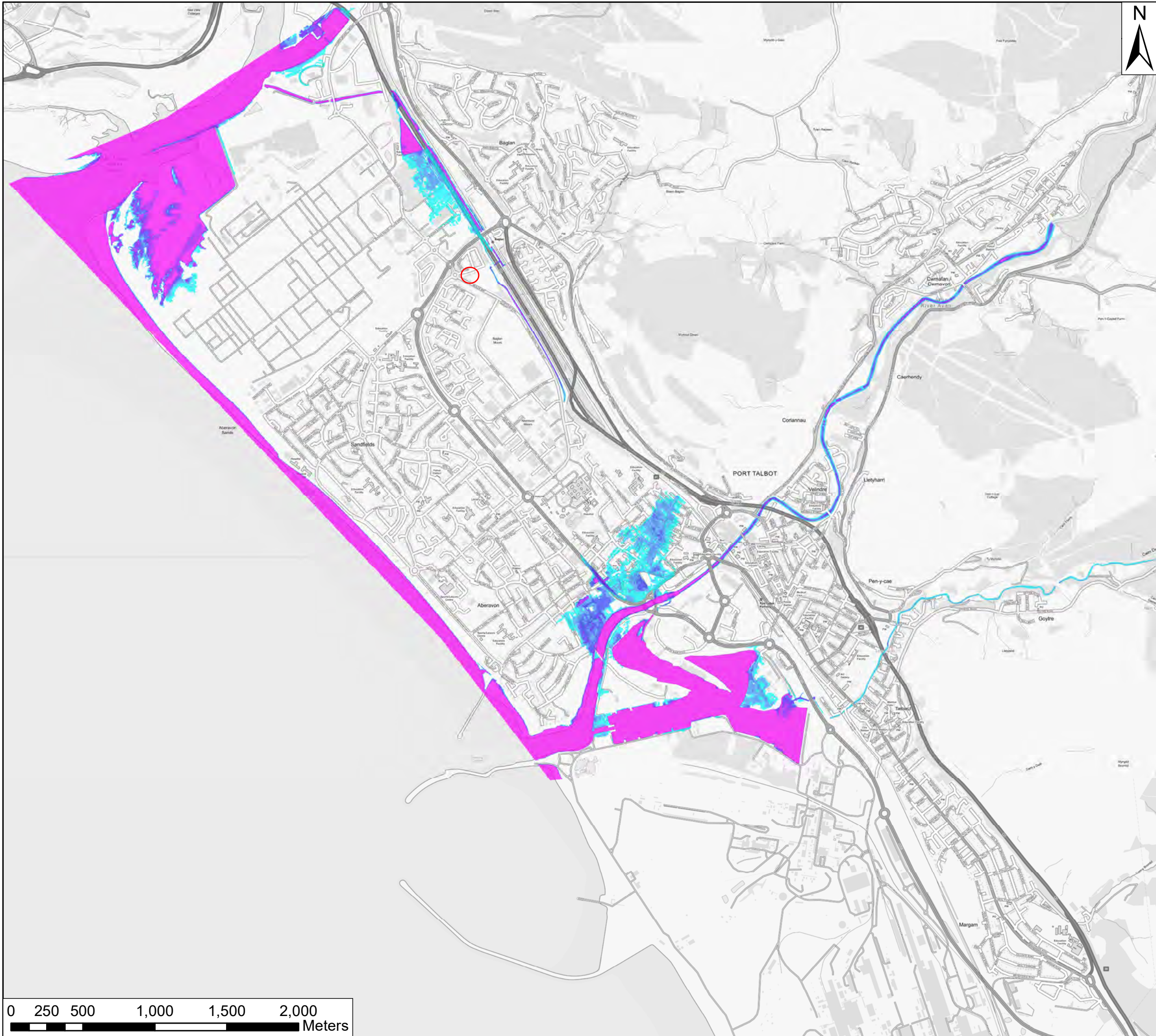
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Neath Port Talbot County Borough Council

Port Talbot Harbourside PAR
Fluvial Depth Grid - 0.1% AEP

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Drawing 2016s4827_PT_007		Sheet No.: 7 of 16	Rev.: A



KEY

Tidal 0.5% AEP event (2116)

Depth (m)

0 - 0.25

0.25 - 0.5

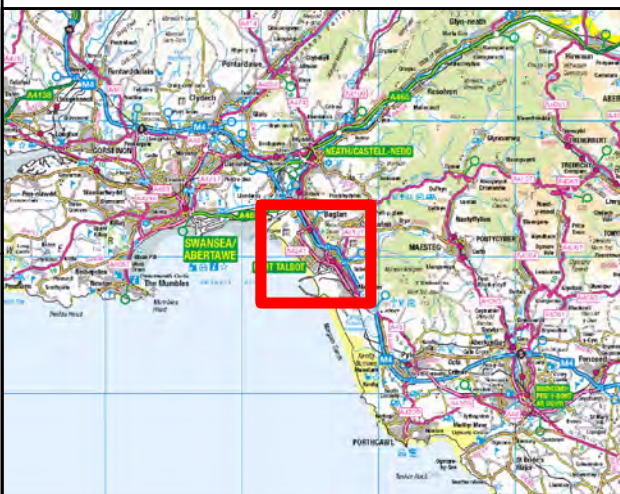
0.5 - 0.75

0.75 - 1

1 - 1.5

1.5 +

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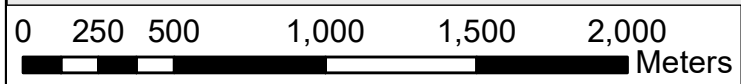
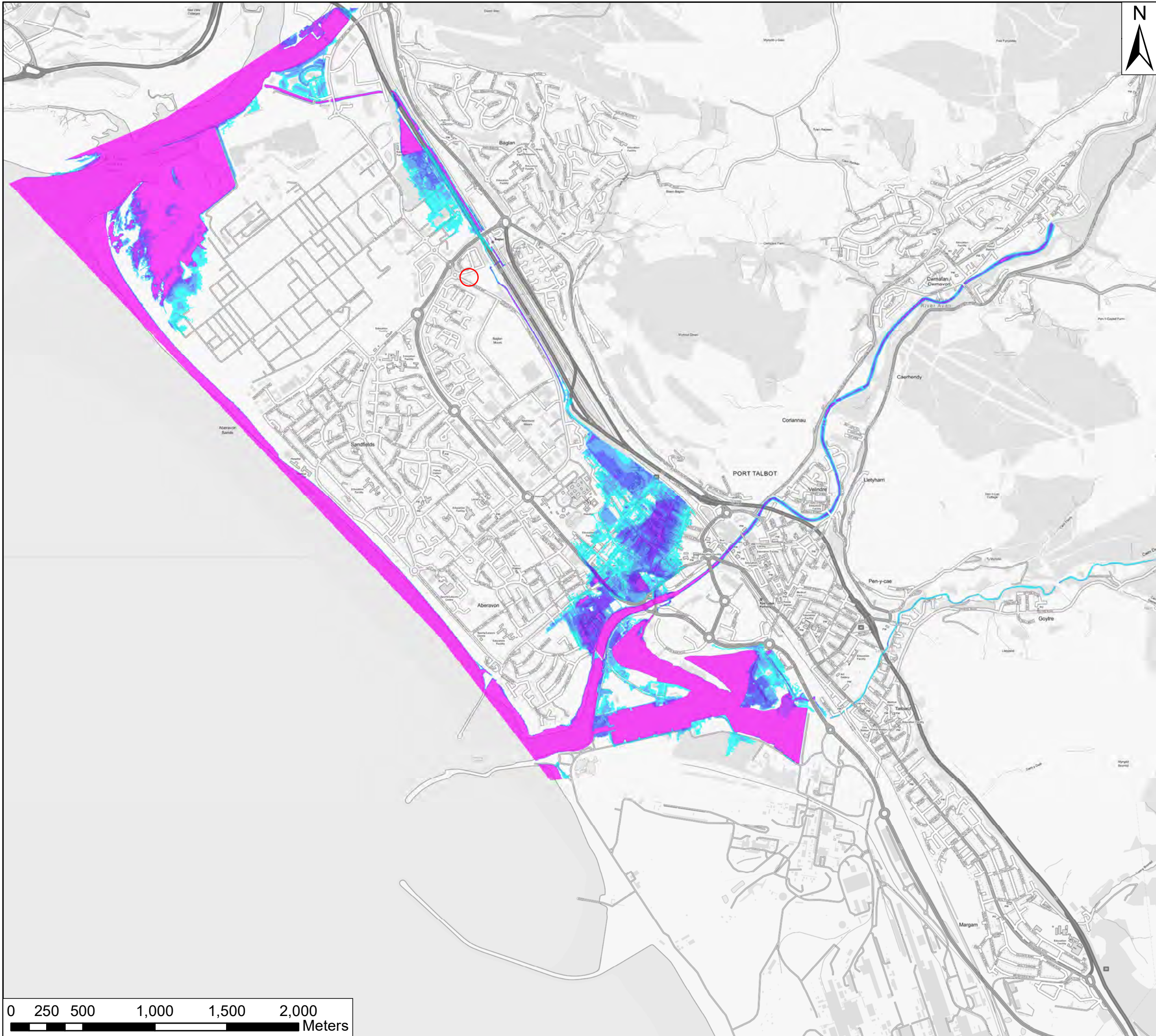
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for
Neath Port Talbot County Borough Council
Port Talbot Harbourside PAR
Tidal Depth Grid - 0.5% AEP

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	Approved	GB	04/05/2017
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Drawing 2016s4827_PT_008		Sheet No.: 8 of 16	Rev.: A



KEY

Tidal 0.1% AEP event (2116)

Depth (m)

0 - 0.25

0.25 - 0.5

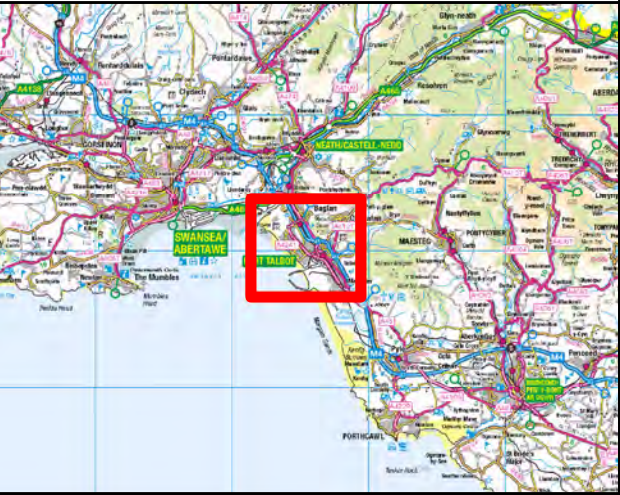
0.5 - 0.75

0.75 - 1

1 - 1.5

1.5 +

KEYPLAN



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Neath Port Talbot County Borough Council

Port Talbot Harbourside PAR
Tidal Depth Grid - 0.1% AEP

Scale: 1:25,000 Original @ A3	Drawn	MOF	04/05/2017
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Digital File Name: 2016s4827_PT_009.MXD			
Drawing 2016s4827_PT_009		Sheet No.: 9 of 16	Rev.: A

APPENDIX G: Management & Maintenance Plan

Management and Maintenance Plan for Sustainable Drainage (SuDS):

Development at Baglan Boxing Club,
Fenbrook Close,
Port Talbot,
SA12 7PA

Prepared for:

Baglan Boxing Club

REF: 10986-DSR

DATE: January 2023



Vale Consultancy
CONSULTING CIVIL & STRUCTURAL ENGINEERS

Document Control

Project	Development at Baglan Boxing Club
Client	Baglan Boxing Club
Vale Consultancy Ref:	10986-MP

Document Checking:

Prepared By: N Crothers

Signed:



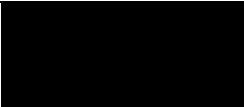
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Verified By: M Jones

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Issue	Date	Status
1	26.01.23	First issue

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1. INTRODUCTION

- 1.1. This SuDS Management and Maintenance Plan has been prepared by Vale Consultancy in support of a SuDS scheme for the proposed development at Baglan Boxing Club, Fenbrook Close, Port Talbot, SA12 7PA.
- 1.2. The proposed scheme is to construct three extensions to the existing structure as well as a new access road and car park.
- 1.3. The scheme incorporates a sustainable drainage system for surface water runoff, which consists of a detention basin, underground geo-cellular soakaway crates and raingardens.
- 1.4. The method for disposal of surface water runoff is to discharge to ground via infiltration.
- 1.5. The purpose of this document is to set out the overall management and maintenance objectives for the proposed SuDS components and to describe the long-term maintenance required to allow the system to continue operating as is it intended.
- 1.6. All references to SuDS components are based on the SAB submission drawings:
 - *10986-500: Drainage Plan*
 - *10986-501: Drainage Details*

2. MANAGEMENT RESPONSIBILITIES

- 2.1. The current site owner shall be responsible for the implementation of the Management and Maintenance Plan. If deemed necessary, all maintenance operations shall be undertaken by a suitable and qualified contractor appointed by the site owner.
- 2.2. All inspections and maintenance work must be recorded. This allows for future assessment of the maintenance activities and their response to the system. It can also provide protection against legal claims should the system be exceeded in a storm event leading to flooding elsewhere.

3. MANAGEMENT OBJECTIVES

- 3.1. The site shall be managed and maintained as an attractive, tidy, and safe finish to all landscape elements.
- 3.2. The proposed planting shall enhance the biodiversity and nature conservation interests.
- 3.3. The Site Owner shall ensure establishment and long-term health of all landscape elements for the benefit of the tenants and visual amenity of the area.
- 3.4. Best Health & Safety practices shall always be used.
- 3.5. To monitor standards and make amendments where required, it is expected that the Site

Owner will review the management work (with reference to this document) at least quarterly for the first year and annually thereafter.

4 INSPECTION AND MAINTENANCE ACCESS

- 4.1. Access for inspection and maintenance can be gained from the Fenbrook Close. Vehicle parking is available on site within the existing car park at the back of the club.

5 MAINTENANCE VISITS OR INSPECTIONS

- 5.1. The Site Owner or appointed maintenance contractor shall carry out a minimum of 12 maintenance visits or inspections per year to check drainage SuDS components. Visits shall be monthly. Additional visits may be needed to deal with extreme weather conditions or specific horticultural requirements.

6 GENERAL

- 6.1. All materials and workmanship are to be to the highest possible standards and shall be in accordance with relevant British Standards, good horticultural and arboricultural practices, and the landscape specification.
- 6.2. The Site Owner shall employ suitably qualified staff for all work and when using sprays and mechanical equipment. All equipment shall be kept in a sound condition, fit for use and purpose.
- 6.3. The Site Owner and their appointed contractors shall comply with all relevant Health and Safety regulations and good working practices.
- 6.4. The Site Owner shall take care when work is beside any structure or paved area and will, at their own cost, be responsible for making good any damage caused.
- 6.5. All work shall be carried out while soil and weather conditions are suitable.
- 6.6. Weeds, pruning's, leaves, rubbish and other arisings shall be removed from site for composting, where possible. No material shall be left on site, and the area shall be left in a neat and tidy condition after each visit.
- 6.7. Entomological or disease infestation shall be dealt with as required and shall be checked at each visit. Control shall be either by spraying with approved chemicals, pruning all dead wood by cutting back to an outward pointing bud or by removal of the affected plants.
- 6.8. Watering during the first two years after planting may be necessary during times of drought in summer months and, when watering is required, it shall be carried out on a regular basis to suit climatic conditions. If conditions are severe or soils are particularly free-draining, careful monitoring and more frequent watering may be necessary to maintain good plant

health and avoid plant failure.

- 6.9. Plants shall be re-firmed when necessary to ensure that plants are securely planted and upright.
- 6.10. Bark mulch levels shall be maintained, being topped up when necessary to a minimum depth of 50mm. Any spillages shall be swept back on to the bed from surrounding areas, ensuring no plants are smothered.
- 6.11. Edge valleys in beds shall be maintained to reduce mulch spillage and grass edges shall be cut at each maintenance visit.

7 ORNAMENTAL PLANTING

Specific objectives:

- To ensure early establishment and healthy growth
- To maintain a dense canopy cover
- To maintain year-round appearance and visual interest

Maintenance Operations:

- 7.1. All shrub beds in the raingarden shall be maintained substantially free of weeds. Work shall be done either manually or with appropriate selective weed killer in accordance with manufacturer's recommendations. If weed killer is used the dead weeds shall be removed at the next maintenance visit. Care must be taken to avoid damage to adjacent planting and grass and replaced immediately if affected by weed killer.
- 7.2. Once established, shrubs shall be selectively thinned or reduced in height as appropriate by removal or pruning to allow room for growth and avoid overcrowding/overshadowing and create a natural form rather than cube or cloud shapes. Care shall be taken to avoid over pruning and so creating obvious gaps in the shrub beds.
- 7.3. Ground cover plants shall be clipped or pruned, if necessary, to give a neat and tidy finish and contained within the planting bed. Work to remove dead vegetation shall be carried out during the winter months.
- 7.4. Pruning of herbaceous planting:

In spring cut stems close to the 'crown' or 'dormant' top of the plant, avoiding the removal of new shoots.

 - Tidy up the base of the plant, removing dead foliage and debris.
 - Remove all material from site.
 - If necessary, apply a 50mm layer of fine horticultural mulch. This will help moisture retention in the soil, contribute to weed suppression and allow delicate stems to grow.

- Leave dried flower head over winter for relevant species e.g., ornamental grasses.

7.5. Fertilising:

- One application, just before or at the time of spring growth.
- A balanced fertiliser is required, one high in Phosphorus (which encourages blooming as well as strong roots and disease resistance). Fertilisers high in nitrogen should not be used as nitrogen promotes excess foliage at the expense of flowers and roots which can result in weak stems

8 LITTER COLLECTION

- 8.1. All hard surfacing shall be swept as necessary, and all rubbish removed from site.
- 8.2. Litter picking/clearance shall take place during each maintenance visit and all waste shall be removed from site.
- 8.3. During autumn maintenance visits all fallen leaves shall be collected and removed from site.

9 TRADITIONAL DRAINAGE

- 9.1. A bi-monthly site inspection should be carried out, checking for any areas that are not operating correctly and collecting/removing litter and debris.
- 9.2. All rainwater pipes, channel drains, gullies and inspection chambers should be inspected biannually, typically spring and autumn.
- 9.3. Any excessive sediment build-up in rainwater pipes, channel drains, gullies or inspection chambers causing blockage or poor performance shall be cleared and cleaned as required.
- 9.4. Geo-cellular attenuation tanks require little to no maintenance. They should however be inspected after every major storm event. For traditional drainage systems it is recommended that a slit trap is incorporated into the pipework at the inlet to the tank. However, in SuDS applications silt and debris is usually removed by upstream SuDS components so there is less need for a silt trap.

10 SUMMARY OF INSPECTION AND MAINTENANCE

10.1. The following briefly summarises the frequency and type of inspections and maintenance required for the SuDS components and drainage system used in this scheme:

10.2. General

- General inspections of SuDS areas (permeable paving, raingarden, inlets and outlets) – monthly and shall include litter collection.
- Biannual check of traditional drainage including rainwater pipes, channel drains, gullies and inspection chambers (as applicable).

10.3. Bioretention areas (raingardens)

- Inspect surfaces for silting and ponding, record de-watering time to determine if any remedial work is required – annually
- Grass cutting (if deemed necessary) – bi-monthly during growing season (April – October)
- Pruning, weed removal and plant replacement, assess plants for disease infection, poor growth and invasive species – annually
- Inspect inlets for damage or blockage at general inspections
- Clear inlet of sediment build-up – as required

10.4. Detention Basin

- Maintenance of detention basins is relatively straightforward for landscape contractors and should only be a small amount of work (if any) over what is normally required for public open spaces.
- Monthly inspection – remove litter/debris, check inlets/outlets, manage surrounding vegetation and nuisance plants
- Cut grass – monthly during growing season (Spring-Summer)

11 LIFETIME MANAGEMENT AND MAINTENANCE COSTS

11.1. The costs associated with the management and maintenance of the SuDS system over the 60-year design life of the scheme has been estimated based on the inspection and maintenance activities in section 10, as follows:

11.2. General

- General monthly inspection by the site owner (incl. litter removal) – no cost as is incorporated in general site maintenance undertaken by site owner
- Biannual check of traditional drainage - no cost as is incorporated in general site maintenance undertaken by site owner

11.3. Bioretention areas (raingardens)

- Grass cutting - no cost as is incorporated in general site maintenance undertaken by site owner.
- Annual pruning/fertilising - no cost as is incorporated in general site maintenance undertaken by site owner.
- Plant replacement over 60 years, assuming 10% of plants need to be replaced each year ($10\% \text{ of } 2.52\text{m}^2 = 0.252\text{m}^2$) @ £15 / m² / year - £227

11.4. Detention Basin

- Cut grass – monthly during growing season (Spring-Summer) – over 60 years @ £15 per cut x 6 cuts per year - £5,400
- Plant replacement over 60 years, assuming 10% of plants need to be replaced each year ($10\% \text{ of } 48.9\text{m}^2 = 4.89\text{m}^2$) @ £15 / m² / year - £4,401

11.5. The total sum of management and maintenance costs for the proposed SuDS over a 60-year design life - **£10,028 or circa £167 a year**