

Flood Consequences Assessment (FCA) For:

Proposed Development at:
Red Barn, Wellfield Road,
Marshfield, Cardiff
CF3 2UB

Prepared for:

Derek Watkins

17856 – FCA

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Vale Consultancy
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LIMITATIONS

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All the Natural Resources Wales (NRW) mapping data used is under special license. Data is current as of **February 2024** 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.

Purpose of the report

The purpose of this report is to outline the potential flood risk to the site, the potential impact of the proposed development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate any identified flood risk.

Consultation

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) including the Development Advice Map (DAM) and Flood Map for Planning (FMfP) Wales.

Product 5 and 6 Data (flood modelled data) has been acquired by NRW and used to inform the FCA.

Newport City Council have been consulted as part of the FCA. The Newport Local Development Plan (LDP) was adopted in January 2015 and now forms the development plan that will form the basis of decisions on land use for planning in Newport. The relevant specific policies relating to flood risk, drainage and climate change have been reviewed and considered as part of this FCA. In addition to the LDP, the following Local Authority (LA) documents and associated relevant policies have been consulted;

- *Newport City Council – Preliminary Flood Risk Assessment (PFRA) April 2011*
- *Newport City Council Local Flood Risk Management Strategy (October 2014)*
- *Newport City Council Local Flood Risk Management Plan (December 2015)*

1 INTRODUCTION

Vale Consultancy has been instructed by *The Client* to undertake a Flood Consequences Assessment (FCA) for the proposed development of 3 new detached residential dwellings including access, parking and a mixture of soft / hard landscaping.

1.1 Existing Site & Location

The existing site is occupied by undeveloped soft landscaping / outdoor garden amenity area.

The site is located at Red Barn, Wellfield Road, Marshfield, Cardiff, CF3 2UB (325898E, 181629N).

The site is bordered by Wellfield Road to the north, neighbouring residential properties to the east, and undeveloped (*Greenfield*) land to the south and west.

The surrounding land use generally comprises suburban / residential, undeveloped fields and some industrial occupation.

Provision of site access / egress is from Wellfield Road; immediately north from the site.

Refer to Figure 1 below and Appendix A.



Figure 1 – Existing Site Location Satellite Imagery

1.2 Proposed Development

The proposed development is for 3 new detached residential dwellings including access, parking and a mixture of soft and hard landscaping. **Refer to Appendix B.**

1.3 Development Vulnerability Classification

Residential development is considered '*Highly Vulnerable Development*' in accordance with Figure 2 of the Welsh Government's TAN15. *Highly Vulnerable Developments* have a lifetime expectancy of 100 years.

1.4 Existing Topography

A topographical survey of the site to metres Above Ordnance Datum (m AOD) was undertaken by Landmark Surveys Wales in July 2019 and is included in the appendices for reference. A review of the survey indicates a maximum level of 6.09m OD in the north and a minimum level of 5.10m AOD in the south extent of the site. The site generally slopes gradually from north to south.

LiDAR data to metres Above Ordnance Datum (m AOD) has also been extracted from NRW's *DataMapWales* online service in the form of a 1m resolution Digital Terrain Model (DTM) to corroborate the findings of the survey and to review the wider lay of the land (beyond the extents of the site boundary).

The wider, general topography slopes from north to south.

Refer to Appendix C.

1.5 Existing Ground Conditions

Reference to the British Geological Survey (BGS) online mapping (1:50,000 scale) indicates Superficial deposits underlying the site as Tidal Flat Deposits comprising Clay, Silt and Sand. Bedrock geology across the area is recorded as St Maughans Formation – Argillaceous Rocks and (Subequal / Subordinate) Sandstone, Interbedded.

The Cranfield University Soilscape online mapping tool indicates that the site and surrounding area are characterised by *Soilscape 21* which is defined as '*Loamy and clayey soils of coastal flats with naturally high groundwater*'.

1.5 Existing Site Drainage

A site visit and reference to online mapping tools indicate the surrounding properties / infrastructure are served by existing and longstanding formal surface water drainage systems. DCWW asset plans have been acquired and indicate public foul assets (x2 rising mains); one within Wellfield Road, and one in the southern extent of the site. The rising mains flow south westerly from here.

Under the naturally prevailing conditions it is assumed that surface water drains into the underlying substrate (where possible), unfettered. Excess pluvial flows are conveyed south, following the fall in topography. The area is characterised by a network of land drains which discharge into Blackwater Reen / Broadway River.

Refer to Appendix C.

1.6 Proposed Site Drainage

The proposed drainage strategy will be designed in accordance with national and regional policy, guidance and legislation and will be subject to a successful Sustainable Drainage Systems (SuDS) Approval Body (SAB) Application. The drainage strategy and design are to be undertaken by *Vale Consultancy* and should be referred to.

2 FLOOD ZONE CATEGORY AND POLICY CONTEXT

2.1 Flood Zone Category

Development Advice Map (DAM)

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.

The DAM is used as a screening tool by Local Authorities to understand where further assessment of flooding may be needed. The DAM has not been updated since 2020 and no further updates are planned due to implementation of the forthcoming and revised TAN15 at some point, in the future. Implementation of the new / forthcoming TAN15 is in a transitional phase.

The site falls within **Zone C1** which is defined by NRW 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.

Flood Maps for Planning (FMfP) Wales

The Welsh Government is due to implement a revised TAN15 at some point in the future. This will be supported by the Flood Map for Planning (FMfP), which shows how climate change will affect flood risk extents over the next century. The map shows the potential extent of flooding assuming no defences are in place. The FMfP has no official status until the Welsh Government implements the revised TAN15. However, it represents the best available source of information that NRW have on flood risk – and therefore is utilised by NRW to inform planning advice. The most up-to-date announcement (from the Welsh Minister for Climate Change) on the coming into force of the new TAN15 states;

'The TAN was originally suspended until June 2023 but the re-consultation now means that this date will no longer be achievable. Given the size and complexity of the task in analysing the responses and making further changes to the TAN it is unlikely that the new version of the TAN will come into force before the end of this year (2023).'

However; this has not materialised and which is leading to widespread planning issues which is hindering sustainable development and causing economic problems for developers and consultants alike. Particularly when no other further updates have been provided. Therefore, the report uses all available information and prioritises the best available information available (namely the FMfP) upon the advice of NRW.

A review of the FMfP shows the site to fall within **Flood Zone 3, 2 and 1 (Rivers), Flood Zone 3 (Sea) and Flood Zone 1 (Surface Water and Small Watercourses)**. The site is located within a **TAN15 Defended Zone (Sea)**.

The site is located within the Gwent, Caldicot and Wentlooge Sub District Internal Drainage District (IDD).

Refer to Appendix D.

3 SOURCES OF FLOODING AND PROBABILITY

3.1 Fluvial

The nearest surface water feature is an unnamed land drain approximately 130m south from the site with the Broadway and Blackwater Reens located further afield (approximately 350m south). The *Rhymney River* is located approximately 3.5km west from the site; The *Ebbw River* is approximately 5.8km to the east, with the *Usk River* immediately beyond (further east). *Main Rivers* are usually larger streams and rivers but also include some smaller watercourses. In Wales, main rivers are legally designated by NRW. If you want to carry out works in, over, under or near a main river, or in a flood plain or flood defence (including a sea defence), you will need to apply for a Flood Risk Activity Permit. It can be concluded that the proposals are exempt from a Flood Risk Activity Permit. The Severn Estuary is approximately 2km due south. The Wentlooge Levels are located to the south and are protected by formally managed and maintained sea defences, with the sea wall situated at the tidal extent of the Severn Estuary. The Wentlooge Levels are drained by a comprehensive network of drainage *reens* which manage surface water in the area and comes under the tenure of Caldicot and Wentlooge Internal Drainage District (IDD). A review of the FMfP indicates that the site is mostly located within **Flood Zone 1 and 2 (Rivers)**. The south eastern extent of the site is partially located within **Flood Zones 2 / 3 (Rivers)**. Relevant definitions (as per NRW) are provided below;

- *Flood Zone 1 (Rivers) – Areas with less (<) than 0.1% (1 in 1000) chance of flooding from rivers in a given year, including the effects of climate change ;*
- *Flood Zone 2 (Rivers) – Areas with between 0.1% and 1% (1 in 1000 to 1 in 100) chance of flooding from rivers in a given year, including the effects of climate change ;*
- *Flood Zone 3 (Rivers) – Areas with more (>) than 1% (1 in 100) chance of flooding from rivers in a given year, including the effects of climate change.*

NRW have provided Product 5 and 6 Data. However, the models are considered to be out-of-date and do not incorporate or include the appropriate climate change allowances to determine compliance with A1.14 and A1.15 of TAN15. The FMfP displays predicted / estimated flood extent and risk under the *central* climate change allowances for planning purposes. Therefore, areas within Flood Zones 1 and 2 can generally be considered compliant with A1.14 of TAN15. Any *Highly Vulnerable* aspects of the proposals that are located within Flood Zone 3 should have a Finished Floor Level (FFL) raised above that of DFLs during critical events. Updated hydraulic modelling will be required for this and will be published by NRW at some point during the future. The relatively small nature and scale of the scheme does not warrant independent hydraulic modelling.

It should be noted (and for context) that upon interrogation of 'old' (or what NRW consider as out of date / unvalidated) modelled data (specifically the *EbbwLowerICM_5_V1.0_2018* model); the site is shown to remain flood-free up to and including the Q100 Defended Fluvial Event including a 70% (upper extent) allowance for climate change. This alludes to a *low* fluvial flood risk. Therefore, and until such time that updated flood modelled data which incorporates the appropriate climate change allowances and can be considered *valid* – the FMfP should be used as the *best* available source of information to inform this FCA and planning. From a review of the FMfP and an overlay of the indicative proposed site layout which are included in **Appendix D**, for reference; it can be deduced that the large majority of the developable aspects of the proposals are located within Flood Zones 1 and 2. Plot 01 and the access surface are located in flood zones 1 and 2. Plot 02 is largely located within Flood Zone 2 and very marginally in Flood Zone 3. Approximately 50% of Plot 03 is located within Flood Zone 3. There are no records or incidents of historical flooding at the site or within the vicinity. Although the site is shown to be at risk of fluvial flooding; the perceived risk is greater than that of reality as the site remains flood-free during the Q100 Defended Fluvial Event + 70% CC. Implementation of *Mitigation Measures and Recommendations* (Section 5) will ensure that the risks and inherent associated consequences are *residual, manageable* across the lifetime of the development and *accepted* by the developer.

Refer to Appendix D.

3.2 Tidal

The site is located within Flood Zone 3 (Sea) on the FMfP which means that under naturally prevailing conditions (disregarding the benefits of existing flood defence infrastructure) the site is considered to be at more (>) than 0.5% (1 in 200) chance of flooding from the sea in a given year, including the effects of climate change. However, the site is served by significant flood defence infrastructure and hence why the area is defined as a **TAN15 Defended Zone (Sea)**.

NRW define TAN15 Defended Zones as; *Areas that benefit from Risk Management Authority flood defences with the following minimum standard of protection (SOP):*

1 in 200-year (present day) for the sea.

For flood defences built from 2016 onwards there must be allowance for climate change and design freeboard.

The Newport Flood Risk Review (November 2022) by JBA states;

Tidal Flood Risk & TAN-15

Flood defences found along the River Usk and its tidal tributaries in the Newport City Council authority area and around its coastline are maintained by NRW. As a result of these flood defences, a significant part of the tidal floodplain in Newport is categorised as a TAN-15 Defended Zone. Therefore, all forms of development are possible if the requirements of the Justification Test can be satisfied.

The Caldicot and Wentlooge levels are protected by NRW flood defences. In these tidal areas it is known that with the application of climate change, the coastal defences overtop which results in a large tidal flood extent with significant depths of flooding. This increase in flood risk may make it difficult to meet the requirements of the acceptability criteria of TAN-15.

The NRW FMfP identifies that a significant part of Newport is within Flood Zones 2 and 3 and therefore is at risk of tidal flooding. This is from the overtopping of the coastal defences along the Severn Estuary and the tidal influence on the River Usk and smaller watercourses in the city. A large part of the area at risk of flooding is the Caldicot and Wentlooge levels located along the tidal estuary. These areas contain a number of reens. Flooding from the reens is predominantly tidally influenced, although a fluvial flood risk is still present. Using best practice and **all** of the best available data; the *CaldicotAndWentlooge_5_V1.0_2016* modelled data has been reviewed (even though it is recognised that this is considered 'out-of-date' and does not incorporate appropriate allowances for climate change. During the T200 + CC event the majority of the site is shown to be flood – free. However, the southern extents of the site are shown to flood with a maximum design flood level (DFL) of **5.202m AOD**. A maximum inundation velocity of 0.015 m/s (which is compliant with A1.15 of TAN15) is recorded. Given that a minimum existing level of 5.10m AOD is recorded at the site; and the requirement of building regulations to situate FFLs at least 150mm above surrounding ground levels – the plots will have FFLs at levels in the order of **at least** 5.25m AOD. Based on previous CC allowances; this demonstrates compliance with A1.14 of TAN15. Strictly speaking; for the site and proposals to wholly comply with A1.14 of TAN15; the entire site as defined by the Application Site Boundary should be raised above the DFL during the critical T200 + CC Event. Taking into consideration existing site levels; this would easily be achievable with minor cut and fill that would **even** the site further and ensure no loss of flood storage / increase in flood risk elsewhere.

In the absence of reliable and up-to-date Product 5 & 6 Data; the UKCP18 methodology has been used to determine the potential tidal flood risk posed to the site. The updated 2018 model applies new sea level science and improvements to statistical methods to update the '*pre-existing*' (2011) extreme sea levels. The science behind climate change projections for sea level rise has changed substantially in recent years. There is greater confidence in the revised projections of global mean sea level presented by UKCP18, which reflects regional variation. This guidance has been updated to reflect the higher central allowance (70th percentile)

and upper end allowance (95th percentile) of RCP² 8.5. This reflects an increase in global mean surface temperature of around 4.3^oC by 2100. Table 3 of the document sets out estimates of cumulative sea level rise for each local authority area to 2100 and 2120 (to reflect the 100-year lifetime expectancy for new residential developments. The allowances are derived using the UKCP18 2100 dataset. The allowances in Table 3 are provided as a guide, with the 2100 figure currently appropriate for development with a 75-year lifetime expectancy. As a minimum, development proposals should be assessed against the relevant regional 70th percentile presented in Table 3 to inform design levels. An assessment should also be made against the 95th percentile to inform mitigation measures, access / egress routes, and emergency plans. From the updated (2018) model the current extreme sea levels for the 1 in 200 (0.5% AEP) and 1 in 1000-year (0.1%AEP) events are:

T200 : 8.11m AOD;
T1000 : 8.45m AOD.

Taking into consideration climate change allowances as per NRW guidance / methodology (September 2021), and a 100-year lifetime for the development, the estimated extreme sea design flood levels (DFLs) during the T200 and T1000 events are:

T200CC (70th %) : 9.12m AOD;
T200CC (95th %) : 9.44m AOD;
T1000CC (70th %) : 9.46m AOD;
T1000CC (95th %) : 9.78m AOD.

The coastal sea defences serving the site comprise an embankment (*Peterstone Embankment*) which has a recorded cover level of **10.6m AOD**. Thus, the formal flood defence infrastructure serving the site provides a minimum standard of protection (SOP) (of at least) commensurate to all of the DFLs up to and including the T1000CC (95th %) event, with a supplementary freeboard of 0.82m. Therefore, it has been ascertained that the tidal flood defences serving the site meet the requirements and definition of the TAN15 Defended Zone (Sea) as per the FMfP. It also demonstrates compliance with A1.14 and A1.15 of TAN15. The tidal flood defences along the Wentlooge and Caldicot Levels have a generally good SOP of approximately 0.1% AEP. This is confirmed in the Severn Estuary Flood Risk Management Strategy.

If the defences were to fail or were breached; then the site could flood. However, this would need to be a seriously extreme and highly unlikely (*freak*) event that would cause large areas inland of this stretch of coastline to be completely inundated. There is significant third-party land / infrastructure situated between the potential source of tidal flooding and the site. There are no records or incidents of tidal flooding at the site or within the wider vicinity. As aforementioned (and crucially); the Newport Flood Risk Review (by JBA) states; *Flood defences found along the River Usk and its tidal tributaries in the Newport City Council authority area and around its coastline are maintained by NRW. As a result of these defences, a significant part of the tidal flood plain in Newport is categorised as a TAN-15 Defended Zone. Therefore, all forms of development are possible if the requirements of the Justification Test can be satisfied.*

The site, and flood defence infrastructure that it benefits from, falls under the Severn Estuary Shoreline Management Plan (SESMP) and Newport City Council Local Flood Risk Management Plan. The site falls within the Caldicot & Wentlooge Levels Internal Drainage District (IDD) which are responsible for the day-to-day management of the pluvial on the Gwent Levels drainage system where valuable agricultural, commercial and residential land would otherwise be flooded on an annual basis. The work of the IDD is also essential to maintaining the nationally important ecological and archaeological interest of the area. Therefore, the tidal flood risk posed to the site is considered to be low / residual.

Refer to Appendix D.

3.3 Surface Water and Small Watercourse (Pluvial)

Surface water (or pluvial) 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 'Surface Water and Small Watercourses' map indicates the extent of flood risk from pluvial sources. A review of the maps shows that the proposed development is located outside of the extreme flood extent (**Flood Zone 1**) and therefore is at *low* risk of surface water flooding; meaning it has a less than 0.1% (AEP) annual probability of flooding from surface water / pluvial sources. Site access / egress is also shown outside of the extreme flood extent and is therefore at *low* risk of flooding from pluvial sources. There are no distinct flow routes in the area which would direct any excess surface water towards the site. The proposed drainage strategy (foul and surface water) will be designed in compliance with national and regional policy, guidance and criteria. Furthermore, the proposals will be subject to a successful Sustainable Drainage Approving Body (SAB) Application.

From January 2019 all new developments with a construction area of 100m² or more must have an approved sustainable drainage system (SuDS) to manage on-site surface water. Surface water drainage systems must be designed and built following mandatory standards published by Welsh Government and must be approved by the council's Sustainable Drainage Approving Body (SAB) before work starts. For instance; surface water drainage design must be in accordance with the Welsh Governments Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems (2018). Seeing as the proposals are upon Previously Developed (*Brownfield*) Land; the surface water drainage scheme will need to demonstrate and provide a minimum of 30% betterment over the existing discharge rates as a pre-requisite to a successful SAB Application. Provision of water quality treatment will also contribute to betterment over the existing, unfettered arrangements. Therefore, the proposals present a good opportunity to reduce surface water flood risk to the site; notwithstanding the other required provisions including but not limited to other amenity and environmental associated benefits.

It can be concluded that the risk of surface water flooding to the proposed development is *low / residual*.

3.4 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. There are no distinct flow routes in the area which would direct any potential flooding arising from the local sewer network serving the area. It can be concluded that the site is at *low* risk of flooding from sewers.

3.5 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 Wentlooge Levels are drained by a comprehensive network of drainage reens which manage ground water levels in the surrounding area. Therefore, it can be concluded that the risk of groundwater flooding is *low*.

3.6 Artificial Sources of Flooding

There are no canals or other artificial / man-made surface water bodies within the vicinity which would or could pose a flood risk to the site. The NRW 'Risk of Flooding from Reservoirs' map shows that the site is not considered at risk of flooding from reservoirs.

Moreover, the risk of flooding from reservoirs is extremely unlikely to happen. 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.

3.7 Summary of Potential Flooding

It can be concluded that Tidal represents a potential flood risk to the site; only if coastal sea defences were to fail and originates offshore. Therefore; the risks and inherent consequences are residual and subject to the FRMP.

The fluvial flood risk to the site is considered to be *low*. For reference and to provide some additional context; the NRW (published) River Ebbw Integrated Catchment Model (By *Whallingford HydroSolutions* (WHS) has been used to get an idea of the potential consequences of fluvial flooding from the *River Ebbw* within the catchment as it is the most up to date fluvial flood modelled data available at this location. A review of the modelled results demonstrates the site to be flood free in all Defended Fluvial scenarios up to and including the Defended Fluvial Q100 (1% AEP) Event including a 70% Allowance for Climate Change (CC). This alludes to the relatively *low* fluvial flood risk posed to the site when flood defences and the areas benefitting from them are taken into consideration (i.e. in reality). It can be concluded that the site is at low risk from fluvial flooding.

It has been ascertained that the site is at low / residual risk from tidal flooding. For instance; the dominant source and prevailing conditions causing a flood risk within the tidal floodplain is related to the coincident occurrence of a high astronomical tide, the passage of a storm surge (generated by an atmospheric depression) and the effects of wind related waves.

The study area is diverse, containing saltmarshes, hard and soft defences. The Severn Estuary has one of the largest tidal ranges in the world. This, coupled with the low-lying land of the Wentlooge and Caldicot Levels requires flood defences to prevent the Levels from being reclaimed by the sea. This has resulted in a flood defence network that is well established. This defence system, assuming that it remains intact during an extreme event, effectively separates the sea from the coastal and estuary floodplains for all but the most extreme storm events. The low agricultural plains are also drained and pumped via a network of artificial drains and channels, including pumping stations. Wave overtopping is a complex process controlled by the state of the sea (depth, wave properties) and the geometry of local flood defences. There is a long history of flood defence development and management in the study area and a wide range of flood defence types including a variety of embankments, revetment, vertical seawalls, return-walls and rock armour.

A review of the FMFP indicates that the site falls within **Flood Zone 1 (Rivers)**, **Flood Zone 2 (Rivers)** and **Flood Zone 3 (Rivers)**, **Flood Zone 3 (Sea)** and **Flood Zone 1 (Pluvial)**. Although tidal presents the greatest potential flood risk to the site over its lifetime expectancy; it can be concluded that the site is currently at *low / residual risk* of tidal flooding / the sea.

The site benefits from and is served by formal and well-established flood defence infrastructure and falls within a **TAN15 Defended Zone**. There are no records or incidents of historic flooding at the site or within the vicinity.

The site is located wholly within **Zone C1** on the DAM.

Using and based upon the best information available, it has been concluded that the site and proposals are compliant with TAN15.

Refer to Appendix D.

4 TAN15 ASSESSMENT

4.1 Justifying the Location

NRWs TAN15 document defines Zone C1 as;

'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 test, including acceptability of consequences'.

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 strategy required to sustain an existing settlement or region; and
- Its location in Zone C is necessary to contribute to key employment objectives supported by the LA and other key partner, 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 (Brownfield) Land; and
- The potential consequences of a flooding event for the developed has been considered, and found to be acceptable.

Application of the justification test has been undertaken and it can be concluded that the site and proposals **pass**. Refer to **Appendix B**.

The development is consistent with the land use and image of the area.

The land qualifies for and meets the definition of *Previously Developed* or *Brownfield* Land.

The potential consequences of a flooding event for the development have been considered, and found to be acceptable and manageable across the site's lifetime expectancy.

The proposals raise a good opportunity to improve the existing sites resilience and resistance to the affects of global warming, climate change and flooding in line with the policies contained within the LDP (see overleaf).

The surface water drainage scheme must acquire SAB application which will ensure betterment of the sites existing, unfettered drainage arrangement. On the back of this, there is an argument to suggest that although the proposals will be introducing additional impermeable area across parts of the site; overall; the proposals will reduce pluvial flood risk to the site itself and not exacerbate pluvial flooding anywhere off-site.

For instance; (when successful SAB Application is acquired) the surface water drainage scheme must demonstrate that the proposals **will not** increase flood risk elsewhere. For instance; all runoff intercepted at source and managed on-site via a *SuDS Management Train* concept; proof that the system has capacity to handle the 1 in 100-year storm event plus 30% allowance for climate change including attenuation storage for excess flows in the same event. All surface water to be managed within the extents of the site boundary ensuring no increase to flood risk elsewhere, including any third-part land / infrastructure.

The proposals support the guidance and policy within the Newport LDP and TAN15. For instance; Refer to the relevant polies aims and objectives that have been extracted from the LDP, overleaf.

And from TAN15;

Policy 6 of TAN15, *Justifying the location of development*: 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. Further development in such areas, whilst possibly benefitting from some protection, will not be free from risk and could in some cases exacerbate the consequences of a flood event for existing development and therefore a balanced judgement is required.

Policy 11.19 of TAN15, *Applications for Individual Householders*: Applications for minor extensions or alterations should not raise significant issues unless they are likely to have a direct and adverse effect on a watercourse or its flood defences, would impede access to flood defence and management facilities or where the cumulative impact of such developments could have a significant effect on flood storage capacity or flood flows. In such cases there will be no requirement to justify the location of development but if such minor works are likely to have an adverse effect, then the full consequences of a development will need to be appreciated and assessment undertaken commensurate with the scale and nature of development. Where extensions or alterations are likely to have a direct and adverse effect, authorities should consider making an Article 4 Direction under the Town and Country Planning (General Permitted Development) Order 1995, as amended, to require an application for planning permission so that full consideration can be given to these impacts.

Change of Use 11.20: In many cases planning permission will be required for development where flood risk is a material consideration. However, there may be instances where changes of use, permitted under the Town and Country Planning (Use Classes) Order 1987, as amended, could result in a change from a low vulnerability use to a high vulnerability use and therefore the consequences of flooding may be unacceptable in Zone C. In such circumstances a flooding consequences assessment commensurate with the scale and nature of the proposal will be required.

It is safe to say that the FCA has been undertaken to a sufficient level of detail commensurate to the scale and nature of the proposals. Up until such a time updated modelled data which incorporates up-to-date CC allowances and that which can be officially be deemed as 'valid' by NRW – it is not possible to definitively demonstrate that the site is compliant with A1.14 and A1.15 of TAN15. This is because that when using the 'best available' and 'most-up-to-date' information as advised by NRW (FMfP) there are some areas of the site that are encroached upon by Flood Zones 2 / 3. It has not been possible to deduce DFLs for the critical fluvial event (Q100 + 30% CC) as there is currently no flood modelled data which NRW will accept (to inform FCA for planning purposes) available.

This is frustrating and is clearly leading to some widespread national planning issues, specifically in regards to flood risk and the delayed (elusive) forthcoming legislation. This highlights a classic case of policy precluding investment / development and is therefore not in alignment with the LA LDP vision for sustainable development. For instance; the NRW (published) River Ebbw Integrated Catchment Model (By Wallingford HydroSolutions (WHS) has been used to get an idea of the potential consequences of fluvial flooding from the River Ebbw within the catchment as it is the most up to date fluvial flood modelled data available at this location. The report has been produced in accordance with the WHS Quality Management system which is certified as meeting the requirements of ISO 9001: 2009 and ISO 14001: 2004 and was published by NRW in 2019. Since then; the resolution of LiDAR data available at the site and that has been utilised by the study is the same (i.e. no greater resolution / higher quality) (as per DataMapWales online service). Modelling methodology concurs with up-to-date techniques, software and expertise.

Refer to Appendix D.

5 MITIGATION & RECOMENDATIONS

It has been established that the site is at *low* risk of fluvial flooding, *low/residual* risk from tidal flooding; and either *low, very low or null* risk from all other sources of flooding. Any potential consequences of flooding are accepted by the developer and are manageable across the lifetime expectancy of the development (100-years). The site and surrounding residential areas have not knowingly ever flooded from any sources which have all been identified as posing low risks with minimal consequences (realistically).

Taking a precautionary approach and as an additional factor of safety, mitigation measures should be incorporated into the proposed development as and where possible.

In many senses and as outlined below; the proposals actually present a great opportunity to make the site as a whole more resilient to climate change, global warming and flooding, commensurate with the LDPs definition of sustainable development.

External alterations such as commercial flood guards (barriers) are available and could and should be fitted to doorways. They can be applied and removed as and when by site users / residents and can provide a protection and freeboard to inundation waters of up to 0.6m and will prevent the ingress of waters to properties thus minimising and avoiding internal damage. Other products which would protect the dwellings from inundation and which should be considered; include flood fences, flood doors and air bricks.

Internal alterations and design considerations that could and 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 / fittings and avoid wooden alternatives where possible;
- 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;
- Use robust flood resistant construction techniques.

All construction methods to be inherently flood resilient i.e., polished concrete floors, no plasterboard. Refer to the *BS 85500: 2015, Flood resistant and resilient construction. Guide to improving the flood performance of buildings* (November 2015).

Flood Alerts and Warnings

Flood Alerts and Flood Warnings cover this area. Site owners and residents / occupants should register to receive the service. Flood Warnings Direct is a free service that provides prior warnings of a 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, 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. The Rivers Taff and Ely are amongst the most monitored in Wales. This; coupled with the fact that a combination of specific meteorological conditions in where peak fluvial flows are combined with certain extreme high tides and storm surges which do not happen frequently but in theory could cause overtopping of the defences in place and which the site benefits from. However, this is extremely unlikely as they provide SOPs that are commensurate of that needed to secure compliance with A1.14 and A1.15 of TAN15, including significant freeboard. Furthermore; the risks are considered *residual*; especially seeing that flood evacuation via site access / routes is good and unrestricted and crucially, a significant distance from the sources of flooding meaning residents would have sufficient time to evacuate, store important belongings /

seek safe refuge in the upper floors (well above any DFLs across the proposals' lifetime expectancy). Realistically this would be at the very least 24 hours.

Appropriate documentation should be displayed to inform residents 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 area, 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 evacuation procedure should be a written document which should outline the course of action to site users during a flood.

Newport City County Council Emergency Planning department should be consulted in regards to the evacuation plan and procedure.

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.

5.1 Access and Egress

Provision of safe access / egress is from Wellfield Road. Site access / egress is good and unrestricted.

The site access / egress road is outside all the extreme flood extents (Flood Zone 1) and the Flood Evacuation Route Plan leads to an area *outside* of the extreme flood extents (**Flood Zone 1**) and at higher ground in a direction away from the sources of flooding.

Refer to the Flood Evacuation Route Plan, Appendix D.

5.2 Safe Refuge Area and Flood Procedure

In the highly unlikely event that the site floods without warning then Newport City Council, and the local emergency services will be responsible for public care and safety. In the extremely unlikely event of the site flooding before site users have an opportunity to evacuate via the route specified - the occupants should seek safe refuge in the upper floors which will be well above any DFLs across the next 100-years, including the effects of climate change.

5.3 Finished Floor Level (FFL)

FFLs should be raised 150mm above surrounding ground levels. Based upon existing topographical information the plots will all have a minimum FFL of at least 5.25m AOD.

5.4 Impact on Flood Risk Elsewhere

As stated above and previously within the report, the proposals will not displace flood storage / waters.

Therefore, it can be concluded that the proposed development will not increase flood risk elsewhere. No third-party land or infrastructure would be affected.

6 CONCLUSIONS

The proposed development is for 3 new detached residential dwellings including access, parking and a mixture of soft and hard landscaping.

The NRW DAM map shows the site to fall within **Zone C1**.

The NRW FMfP indicates the site to fall within **Flood Zone 1 (Rivers), Flood Zone 2 (Rivers) and Flood Zone 3 (Rivers)** The site falls within **Flood Zone 3 (Sea)**. The site falls within **Flood Zone 1 (Surface Water and Small Watercourses)**.

The site is served by longstanding flood defence infrastructure in *Good* condition.

The site falls within a TAN15 Defended Zone (Sea) and is protected up to at least the T200 Defended Event plus CC. The site also benefits from fluvial flood defences and is shown to be flood-free during the Q100 Defended Fluvial Event including a 70% allowance for CC.

All other potential sources of flooding have been assessed and are concluded to pose either *low, residual* or *null risk*.

The proposals will not result in an increase in flood risk elsewhere or to third party land / infrastructure.

The proposals meet the requirements and therefore fulfil the justification test.

Mitigation measures and recommendations have been outlined and should be rigorously adopted as far as is practically possible.

The risk of flooding to the development proposal has been addressed and a balanced judgement has been applied in recognising the potential consequences of flooding and using previously developed (*Brownfield*) land.

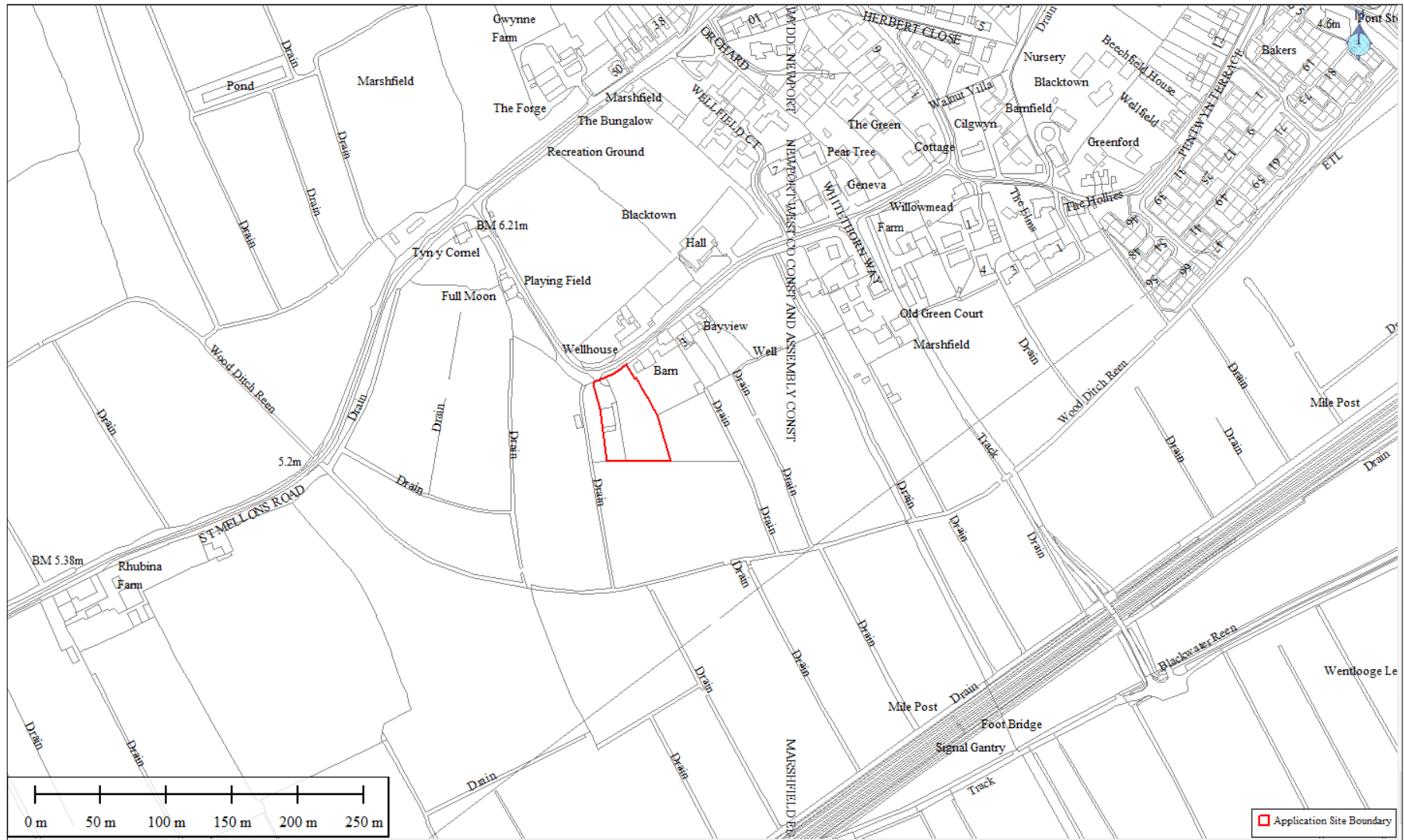
The site meets the definition of Previously Developed or Brownfield Land.

The proposal concurs with the policy contained within the LDP.

Proposed surface water drainage will be in accordance with national, regional and sub-regional policy and guidance.

APPENDIX A: Existing Site and Location Plan

17856 – Red Barn, Marshfields

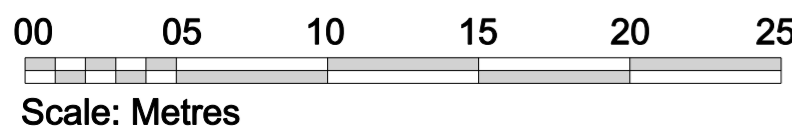


Existing and Site Location (OS) Plan

APPENDIX B: Proposed Site Plans



Proposed Site Plan



- = Existing Sewer
- = Marshfield Settlement Boundary (NLDP)

Richard Whitaker Architects Ltd
 43 Plas Saint Andresse
 Penarth Haven
 Penarth
 CF64 1BW
 Tel: 029 2071 2631
 Mob: 0781 8888 070
 Email: mail@richardwhitaker.com

Site: **Red Barn, Wellfield Road, Marshfield, Cardiff. CF3 2UB**

Title: **Proposed Site Plan Option A**

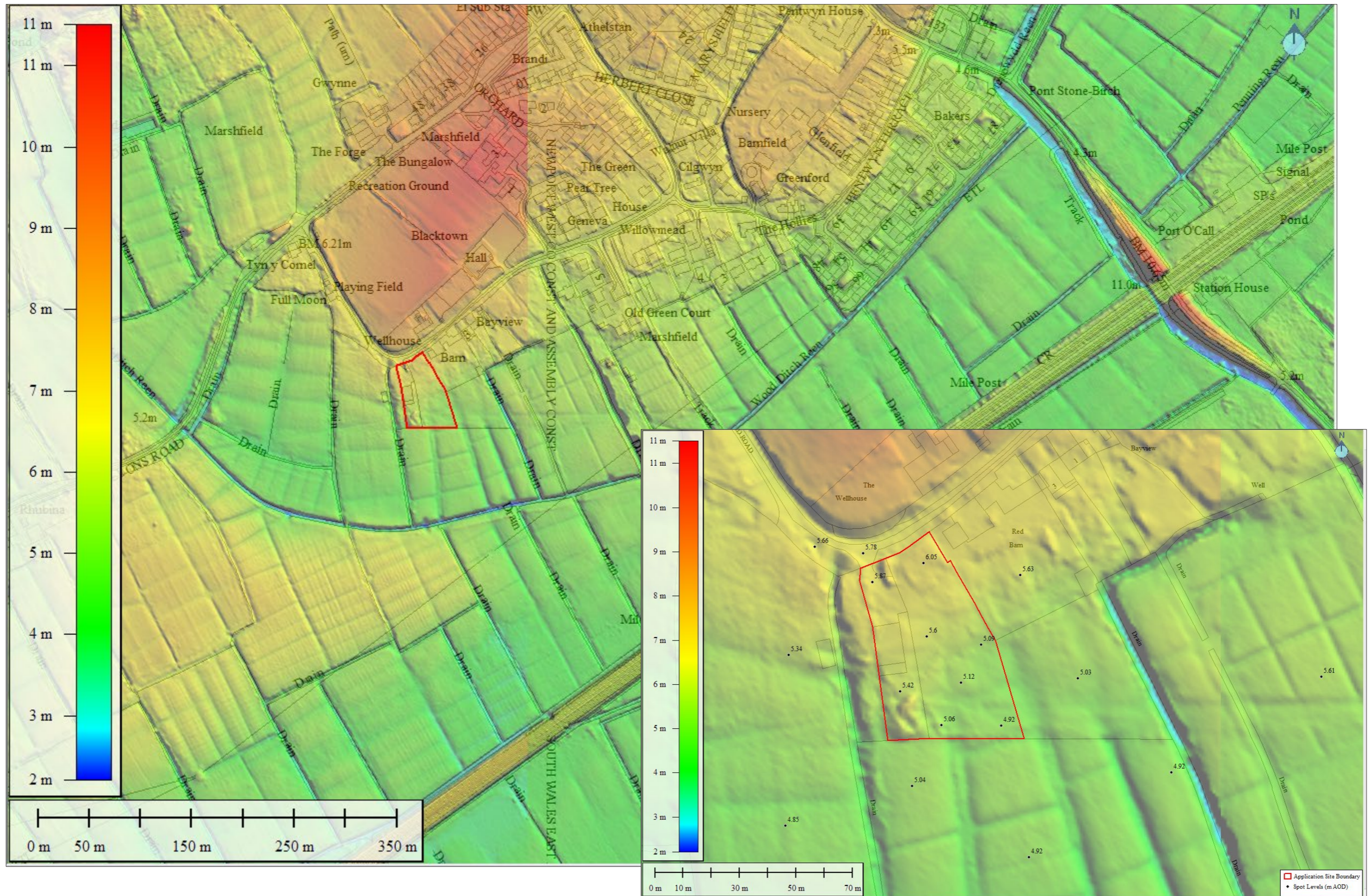
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Date:

Revision:

Drawing No: **560 - S 02 A**

APPENDIX C: Existing Conditions

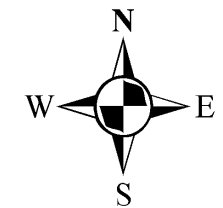


NRW 1m Resolution LiDAR data DTM (to m AOD)



Dŵr Cymru
Welsh Water

Red Barn Wellfield Road Marshfield Cardiff
CF3 2UB



LEGEND(Representative of most common features)

	Foul chamber		Outfall
	Surface water chamber		Lamphole
	Combined chamber		Storm Overflow
	Combined sewer overflow		Rising main
	Special purpose chamber		Gravity sewer
	Treatment works		Private sewer
	Pumping station		Private sewer subject to Sect. 104 adoption agreement
	RED - Combined		S 104
	GREEN - Surface Water		Private Sewer Transfer
	BROWN - Foul		Lateral Drain
	Purple - Former S24 sewers (for indicative purposes only)		Inspection Chamber

Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

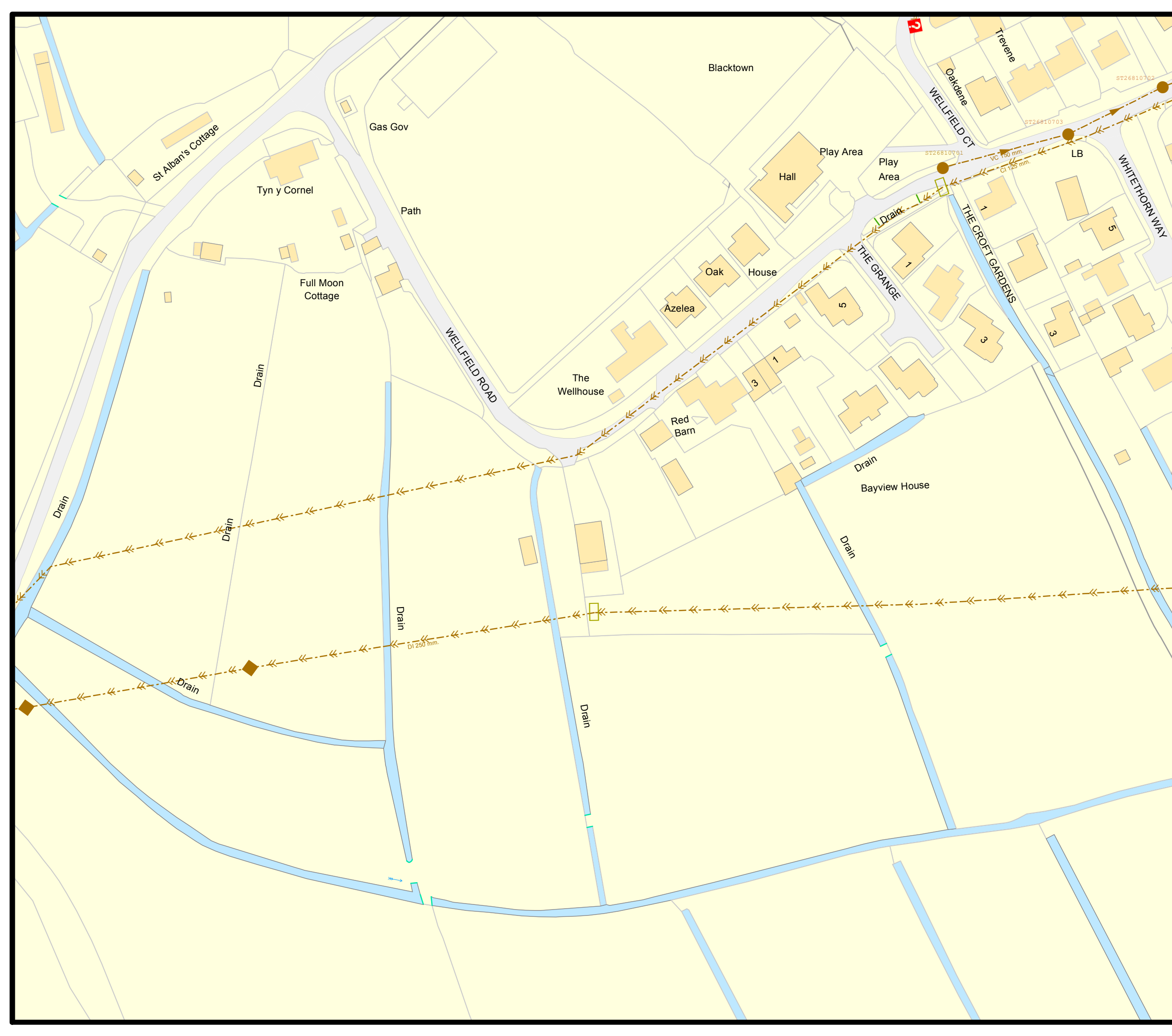
Dŵr Cymru Cyfyngedig ("the Company") gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus. The onus of locating apparatus before carrying out any excavations rests entirely on you. The information which is supplied by the Company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 which is based upon the best information available and, in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a water main, service pipe, sewer, lateral drain or disposal main and any associated apparatus laid before 1 September 1989, or, if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

**EXACT LOCATIONS OF ALL APPARATUS
TO BE DETERMINED ON SITE.**

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Map Ref: 325884,181624
Map scale: 1:1250
Printed by: Zara Howells
Printed on: 17 Aug 2023



APPENDIX D: NRW Flood Maps and Data

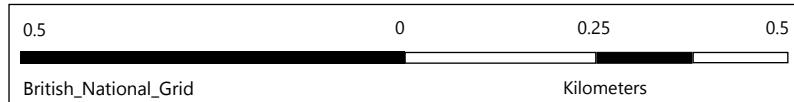
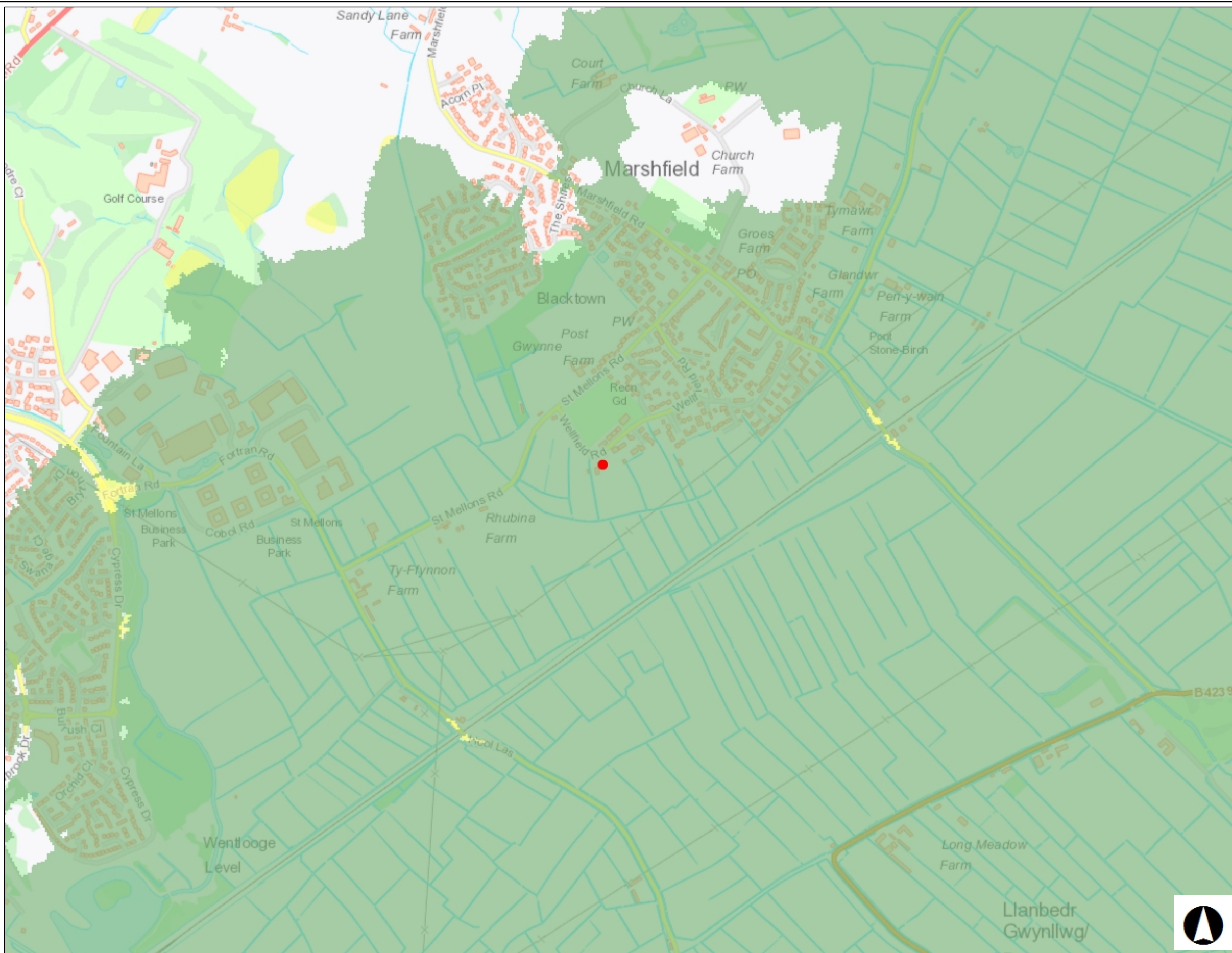
NRW - DAM

Allwedd / Map Key

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

Graddfa / Scale at A3 1: 10,000

Dyddiad / Date
07/02/2024











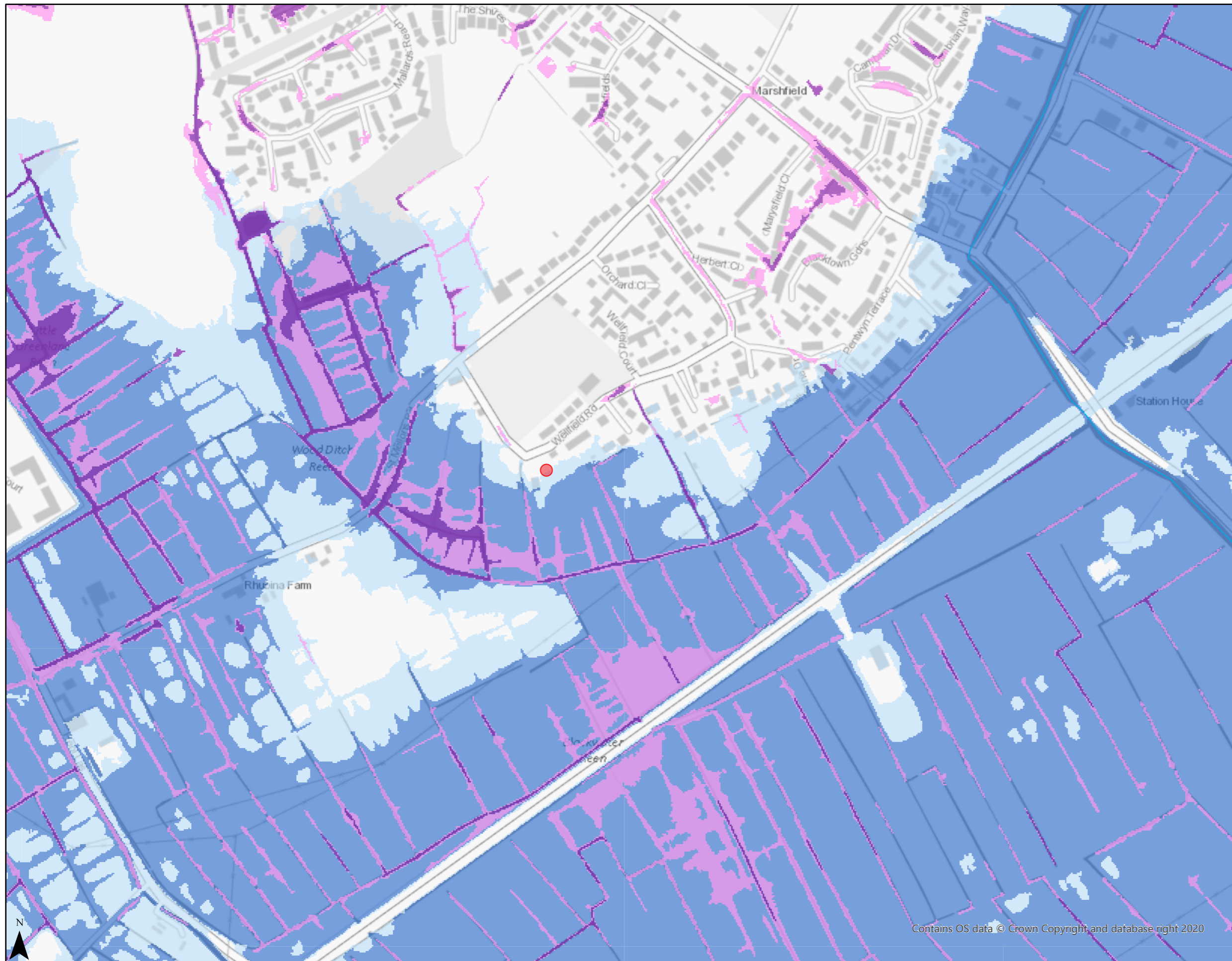
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Flood Map for Planning - Detail
17856 - Red Barn, Marshfield

Legend

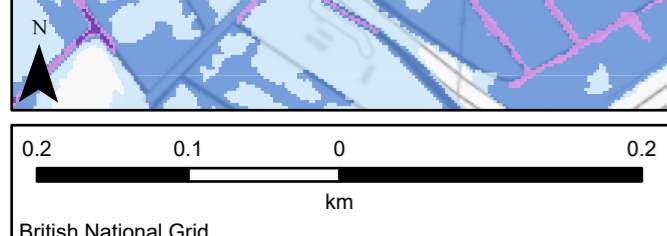
-  Flood Defence Locations
- Surface Water and Small Watercourses
-  Flood Zone 3
-  Flood Zone 2
- Rivers
-  Flood Zone 3
-  Flood Zone 2
-  Recorded Flood Extents
-  Flood Risk from Reservoirs
-  Main Rivers



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Scale at A3: 1:5,000

Date: 07/02/2024









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<https://naturalresources.wales/flooding/disclaimer-for-our-flood-and-coastal-erosion-risk-maps/?lang=en>

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Flood Map for Planning - Detail
17856 - Red Barn, Marshfield

Legend

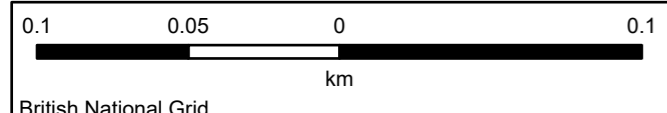
-  Flood Defence Locations
- TAN15 Defended Zones
-  Rivers
-  Sea
-  Rivers and Sea
- Sea
-  Flood Zone 3
-  Flood Zone 2



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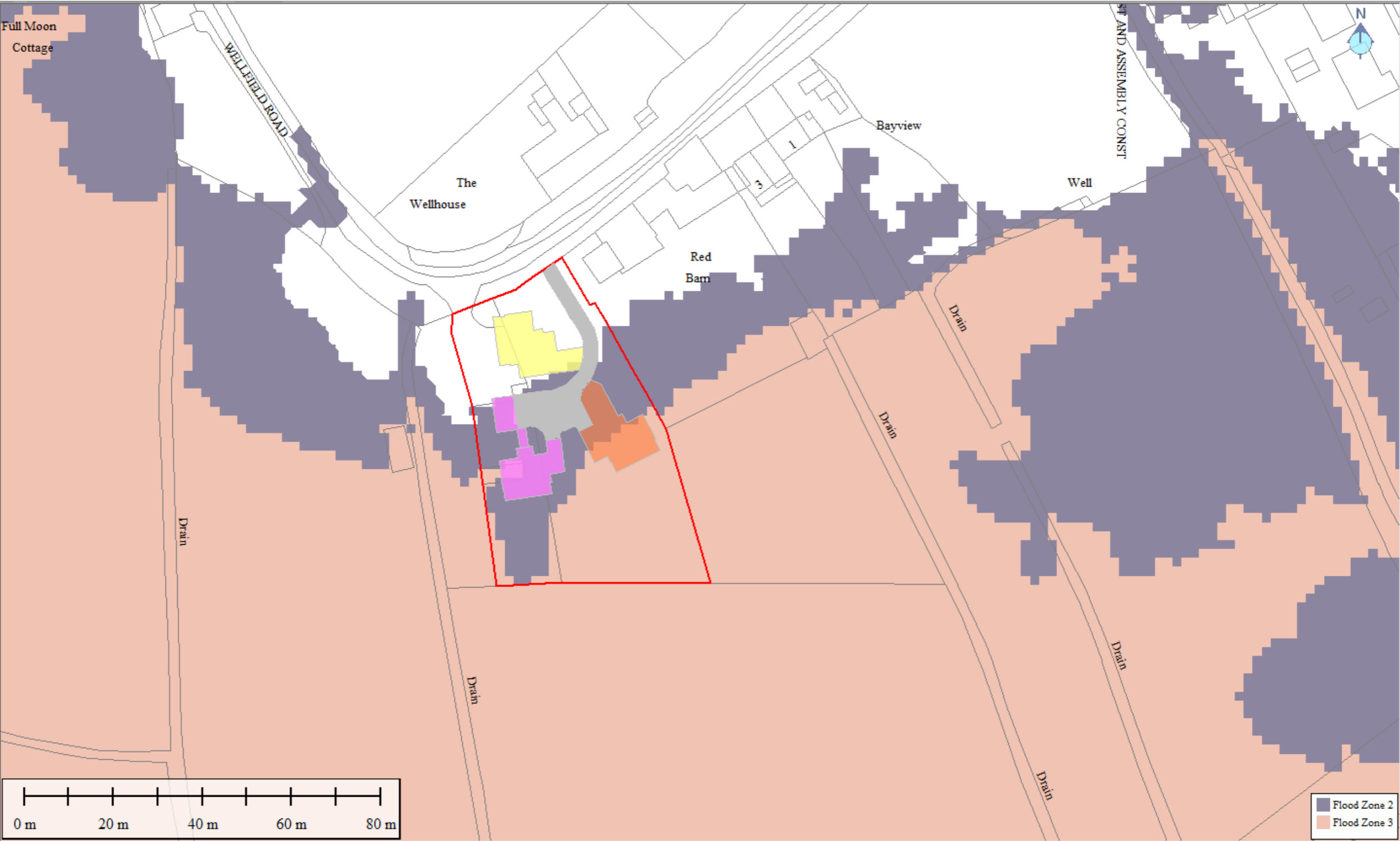
Date: 07/02/2024



British National Grid

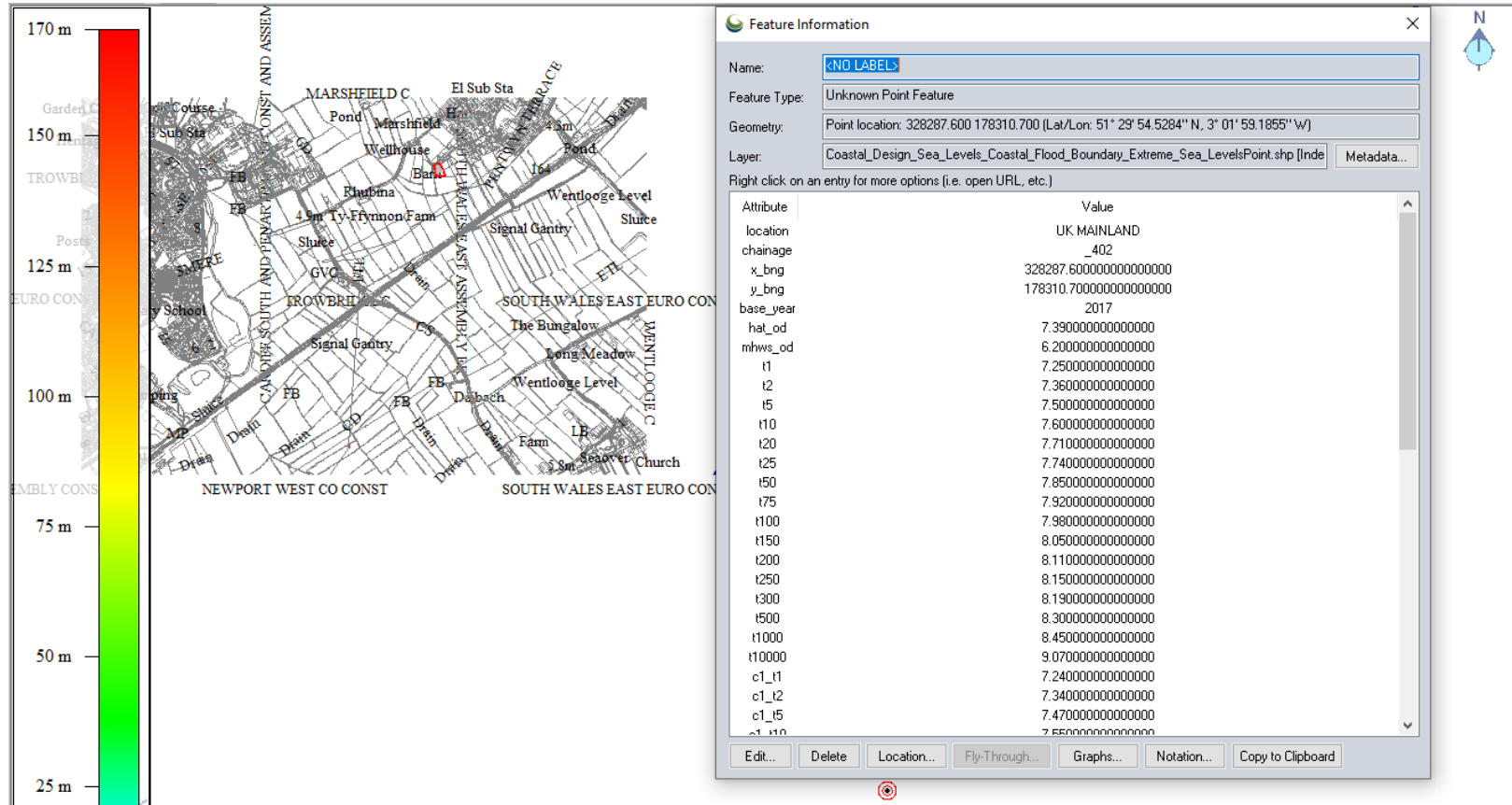
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Overlay of NRW Flood Zones and Indicative Proposed Site Layout

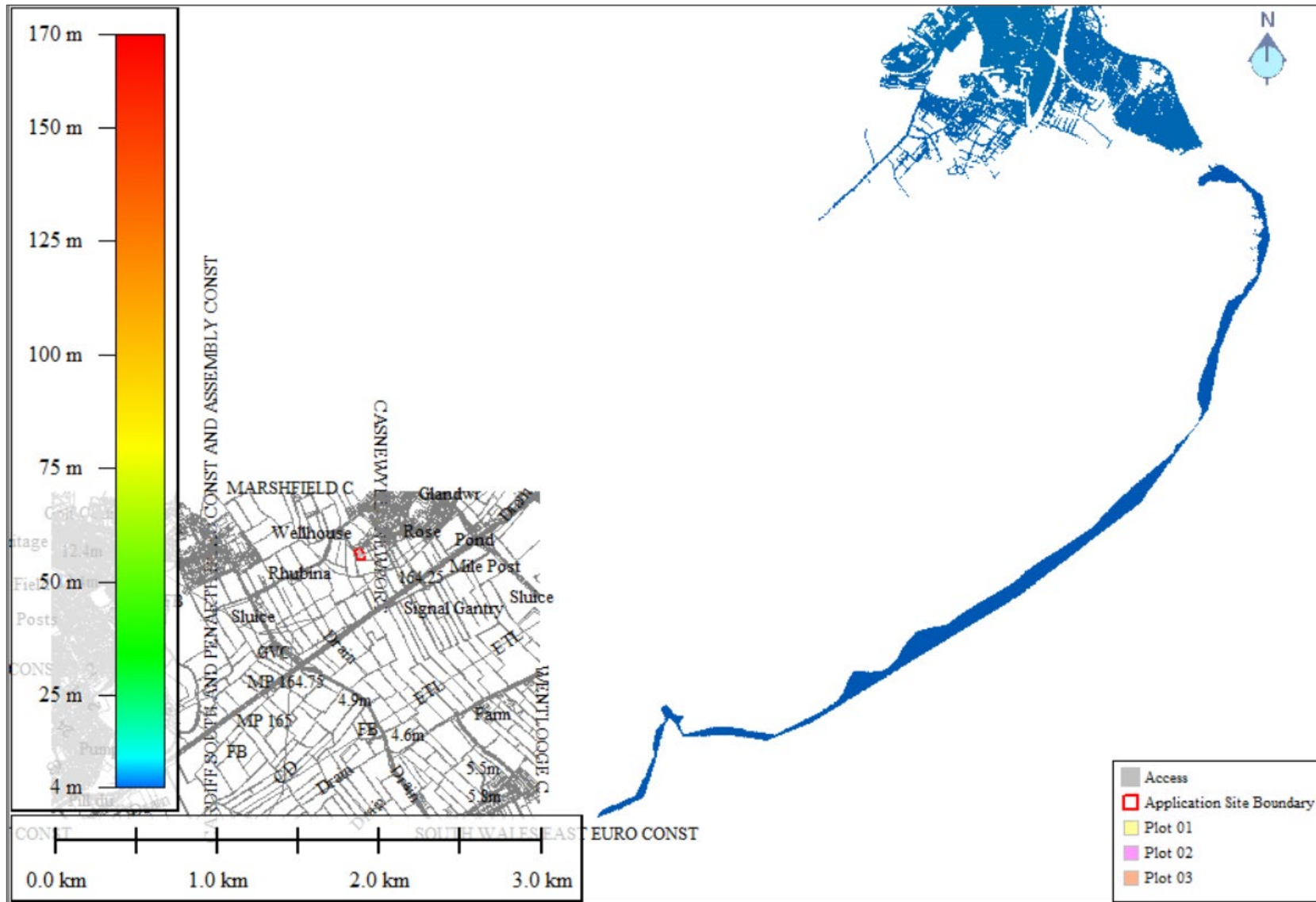
17856 – Red Barn, Marshfield



Coastal Sea Boundary Data

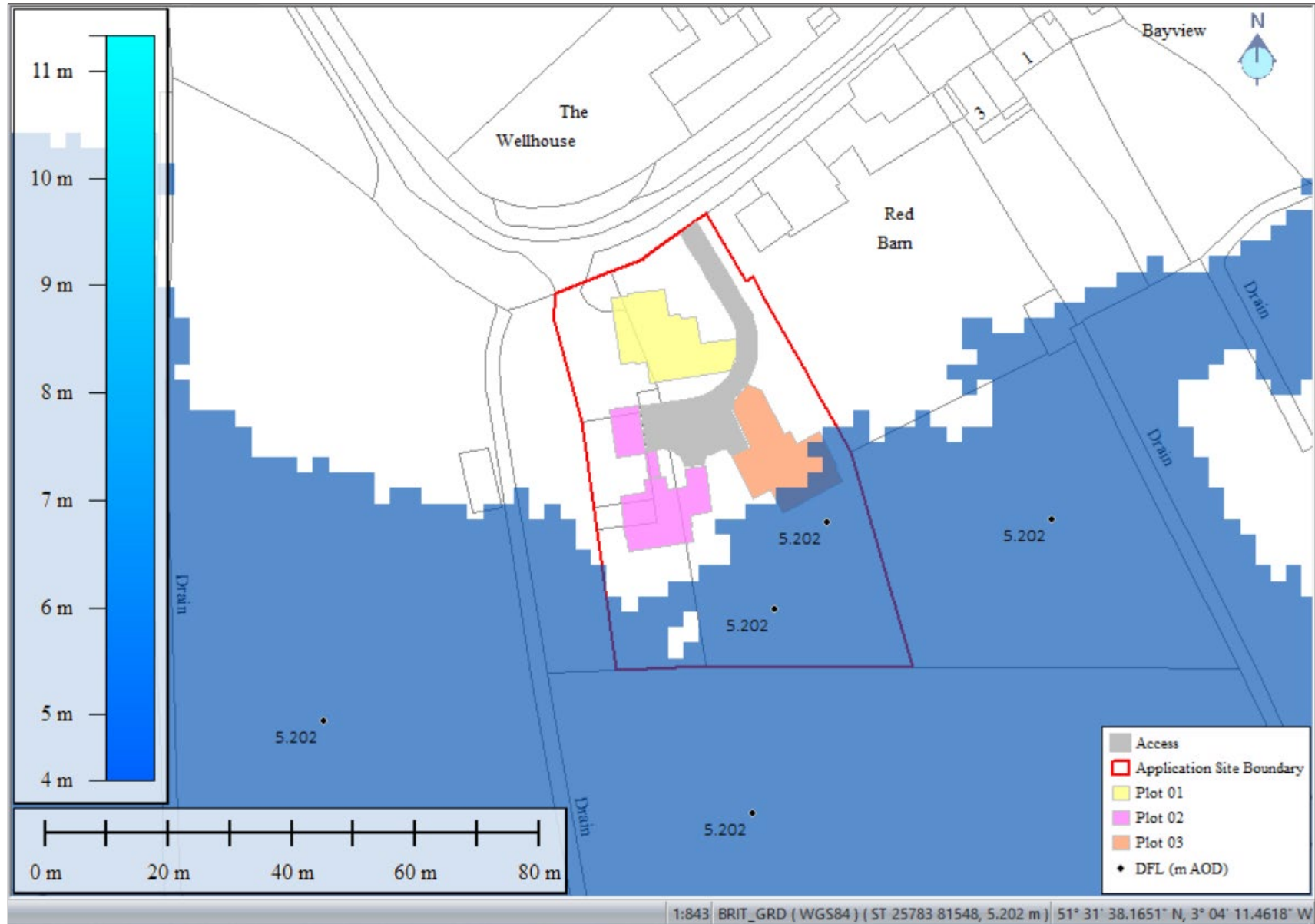
17856 – Red Barn, Marshfield

Local Authority Area	Allowance (percentile)	Mean sea level rise (metres) by 2100 <small>*(UKCP18 baseline 1981-2000)</small>	Mean sea level rise (metres) by 2120 <small>*(UKCP18 baseline 1981-2000)</small>
Newport	70th	0.85	1.01
	95th	1.11	1.33



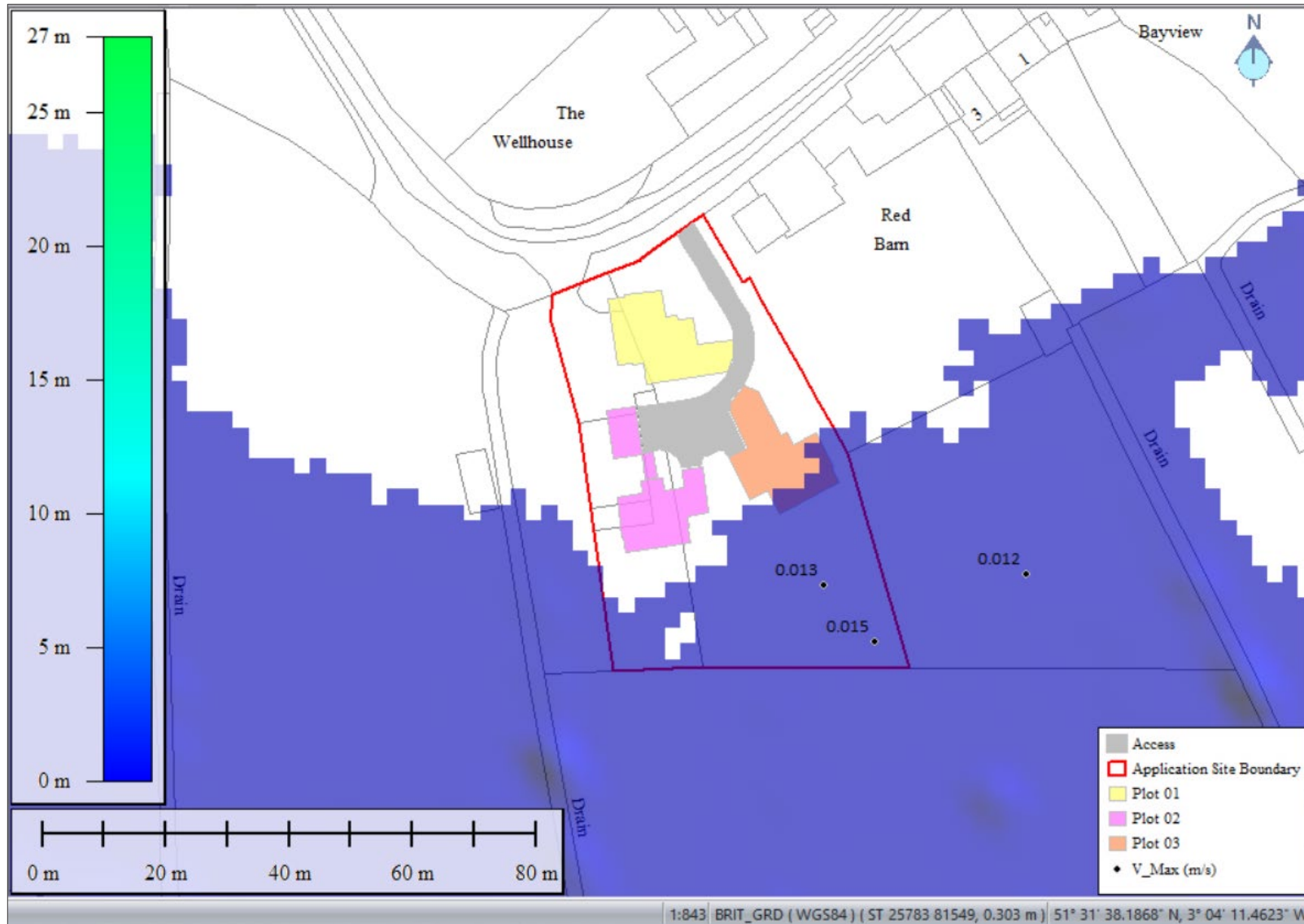
Maximum Flood Extent and Depth during the Defended Q100 + 70% CC Event from the NRW River Ebbw Integrated Catchment Model 2019

17856 – Red Barn, Marshfield



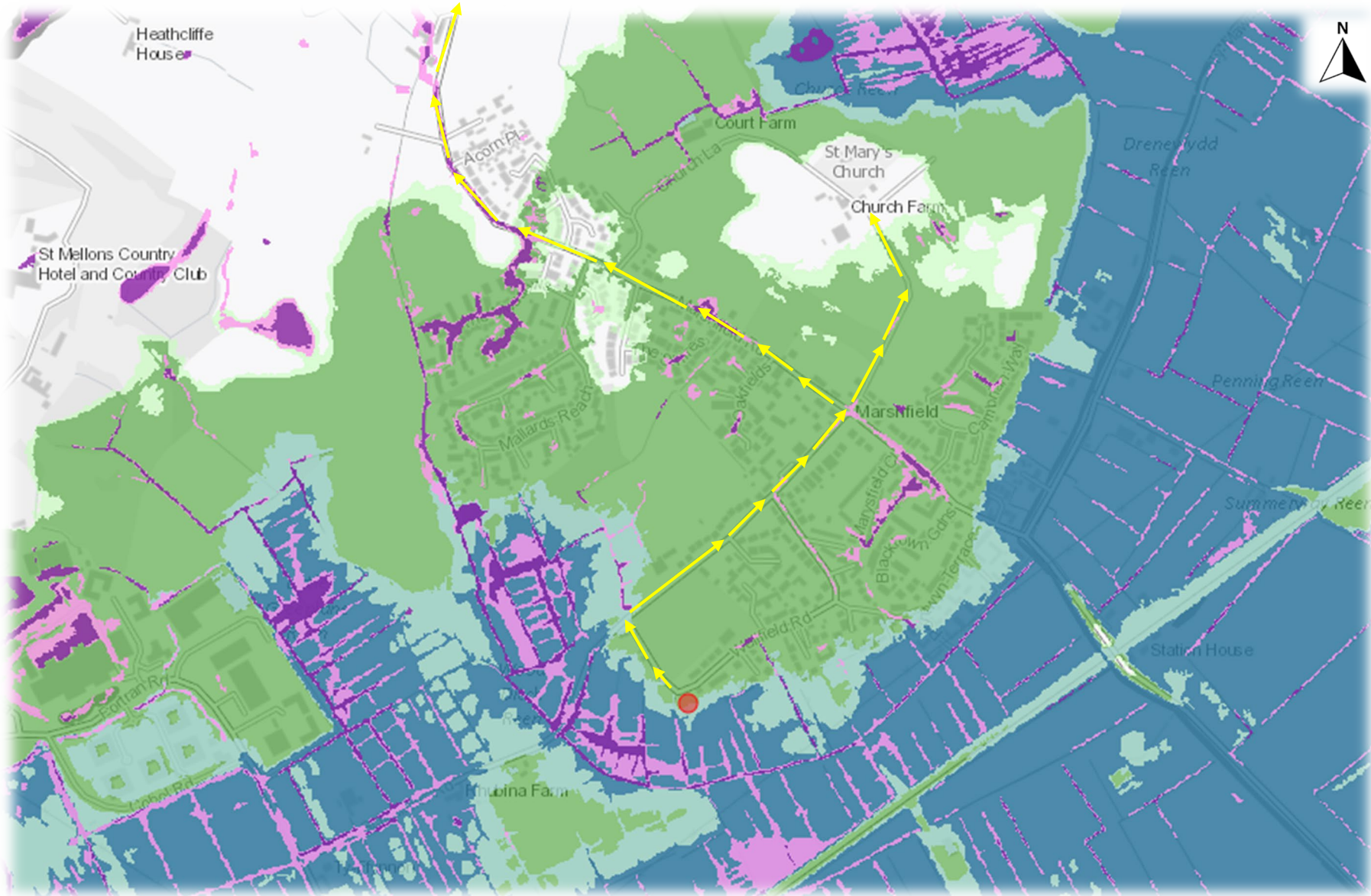
Maximum Design Flood Level (DFL) during the Defended T200 + CC Event from the *CaldicotAndWentlooge_5_V1.0_2016* model

17856 – Red Barn, Marshfield



Maximum Inundation Velocity (m/s) during the Defended T200 + CC Event from the *CaldicotAndWentlooge_5_V1.0_2016* model

17856 – Red Barn, Marshfield



Proposed Flood Evacuation Route Plan overlay with NRW FMfP