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PROPOSED RESIDENTIAL DEVELOPMENT
TYN Y COED, CHESTER ROAD, ROSSETT, WREXHAM

FLOOD CONSEQUENCES ASSESSMENT

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1.0 INTRODUCTION AND DEVELOPMENT DESCRIPTION

1.1 Project Introduction and Objectives

Fiona McClements has commissioned NSugg Ltd. to undertake a Flood Consequences Assessment (FCA) to support an outline planning application for the proposed replacement of the existing dwelling and the erection of nine additional dwellings at Tyn Y Coed, Chester Road, Rossett, Wrexham, LL12 0DE. This document represents a site-specific FCA for the proposed development.

1.2 Planning Policy and Guidance

This FCA has been undertaken with due regard to the following national and local planning policy and flood risk guidance.

1.2.1 Planning Policy Wales

Planning Policy Wales (PPW)¹ sets out the Welsh Government's national land use planning policies to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales.

PPW Paragraphs 6.6.22 to 6.6.29 present the national policy on development and flood risk and confirm that a precautionary approach of positive avoidance of development in areas of flooding from rivers or from the sea should be adopted.

PPW Paragraph 6.6.25 states that development should reduce, and must not increase, flood risk arising from river and/or coastal flooding on and off the development site.

PPW Paragraph 6.6.26 confirms that developments located within flood risk areas remain at risk from flooding even if mitigation measures are applied.

PPW Paragraphs 6.6.17 to 6.6.19 present the national policy on sustainable drainage systems (SuDS) and confirms that new developments of more than one dwelling or where construction works exceeds 100m², require the provision of SuDS and approval from the SuDS Approval Body (SAB) before construction can commence.

PPW is supplemented by Technical Advice Note 15: Development and Flood Risk, which provides further policy advice.

1.2.2 Technical Advice Note (TAN)15: Development and Flood Risk

PPW TAN15: Development and Flood Risk² provides technical guidance with regards development and flood risk and sets out a precautionary framework in the following order of preference:

- Direct new development away from those areas which are at high risk of flooding into low risk areas (Zone A).

¹ Welsh Government, February 2012, Planning Policy Wales, Edition 11.

² Welsh Assembly Government, July 2004, Planning Policy Wales Technical Advice Note 15: Development and Flood Risk.

- Where development has to be considered in high risk areas (Zone C) only those developments which can be justified on the basis of the tests outlined in Section 6 and Section 7 (of TAN15) are located within such areas.

TAN15 is supported by Development Advice Maps which confirm the flood zone extents and which should be used to trigger the appropriate planning tests. TAN15 also includes definitions of vulnerable development and advice on permissible uses in relation to location of development and the consequences of flooding.

1.2.3 Local Policy and Guidance

The following documents provide local flood risk policy and guidance for development within Rossett, Wrexham:

- Wrexham County Borough Council's Unitary Development Plan (adopted February 2005) presents current local planning policy. **Policy EC12: Development and Flood Risk**, states:
Development (including the raising of land) within defined flood plains will only be permitted if it:-
 - a) *would not be subject to an unacceptable risk of flooding on-site; and/or*
 - b) *does not result in an unacceptable risk of flooding on or off-site; and/or*
 - c) *does not adversely affect flood management or maintenance schemes*

Policy EC13: Surface Water Runoff states:

Development which would result in an unacceptable adverse impact on the water environment due to additional surface water run-off will not be permitted.

1.3 Site Location

The application site comprises the detached residential dwelling and grounds of Tyn Y Coed, Chester Road, Rossett, Wrexham, LL12 0DE, as shown on the Site Location Plan within Appendix 1. The site is located on the western edge of the village of Rossett, approximately 7.5km north-east of Wrexham town centre.

The application site is within a residential setting, bound to the north by residential dwellings and a hotel, to the east by Chester Road with a play area, residential dwellings and retail units beyond, to the south by residential dwellings and a public house and to the west by undeveloped grassland. The parcel of undeveloped land immediately north-west of the application site and outlined in blue on the Site Location Plan (Appendix 1) is within the applicant's ownership.

Natural Resources Wales (NRW) Development Advice Maps indicate that the application site lies within flood Zone A, where fluvial/tidal flood risk is not a constraint to development. However, NRW has confirmed, within their statutory pre-application consultation response³, that the more recent Flood Map for Planning indicates that the site extends into Flood Zone 2 and is potentially at risk of river flooding. Therefore, NRW has advised that a Flood Consequences Assessment (FCA) be prepared to support the application, to demonstrate that the consequences of flooding can be acceptably managed over the lifetime of the development and that the development will not increase flood risk to others.

³ Natural Resources Wales, 4th July 2022, Statutory Pre-Application Consultation – Town and Country Planning (Development Management Procedure) (Wales) Order 2012 as amended. Tyn Y Coed, Chester Road, Rossett LL12 0DE. Ref: CAS-191199-Z6V6.

1.4 Topography and Existing Land Use

Review of Ordnance Survey mapping indicates that the local topography is relatively flat-lying with a gentle regional topographic fall to the south, towards the River Alyn and to the east, towards the River Dee. External ground levels at the application site are approximately 16mAOD.

A site topographic survey was undertaken in February 2022 and a copy of the survey is included as Appendix B. The survey confirms that ground levels fall across the site from approximately 16.0mAOD on the south-eastern boundary adjacent to Chester Road, to approximately 15.0mAOD on the north-western boundary.

The application site comprises the existing detached residential dwelling of Tyn Y Coed, driveway off Chester Road and surrounding gardens.

1.5 Geology

British Geological Survey mapping indicates that the local geology beneath the application site comprises superficial River Terrace Deposits (sand and gravel) and Glacial Till (diamicton), overlying interbedded mudstone, sandstone and conglomerate of the Carboniferous Salop Formation⁴.

Published geological logs from boreholes installed in 1969 in similar ground conditions at Rossett Secondary School, approximately 0.6km north-east of the application site, confirmed the following ground conditions:

Top soil: 0.0-0.3m below ground level (mbgl). (0.3m thickness)

Sandy clay or stony clay: 0.3mbgl to approximately 2.5mbgl. (2.2m thickness)

Stiff Boulder Clay: 2.5mbgl to >6.1mbgl (base of borehole)

No groundwater was encountered.

Review of Cranfield University's soil maps⁵ indicates that the soils beneath the application site are defined as Soilscape 6: freely draining, slightly acid loamy soils.

Review of Natural England's MAGIC website⁶ and Natural Resources Wales online mapping confirms that the application site is located within a Total Catchment (Zone III) Groundwater Source Protection Zone, associated with local public water supply abstraction(s). This does not constrain the potential use of infiltration drainage to ground for the management of clean surface water runoff.

1.6 Hydrological Features

The site topographic survey (Appendix B) confirms that the application site is located within the surface water catchment of minor tributaries of Lavister Brook. Lavister Brook flows in a north-easterly direction, discharging into Pulford Brook approximately 1.4km north-east of the site; Pulford Brook flows in an easterly direction to its confluence with the River Dee near Churton.

⁴ British Geological Survey, Onshore GeoIndex, accessed 5th September 2022.

⁵ Cranfield University's Soilscape Map, accessed 5th September 2022.

⁶ <https://magic.defra.gov.uk>, accessed 5th September 2022.

The River Alyn (classified as a main river) flows in an easterly direction passing approximately 250m south of the application site, but the topographic survey confirms ground levels across the site fall towards the north-west, away from the River Alyn.

There are no other watercourses or significant waterbodies in the vicinity of the application site.

The local hydrological setting is presented as Figure 1.

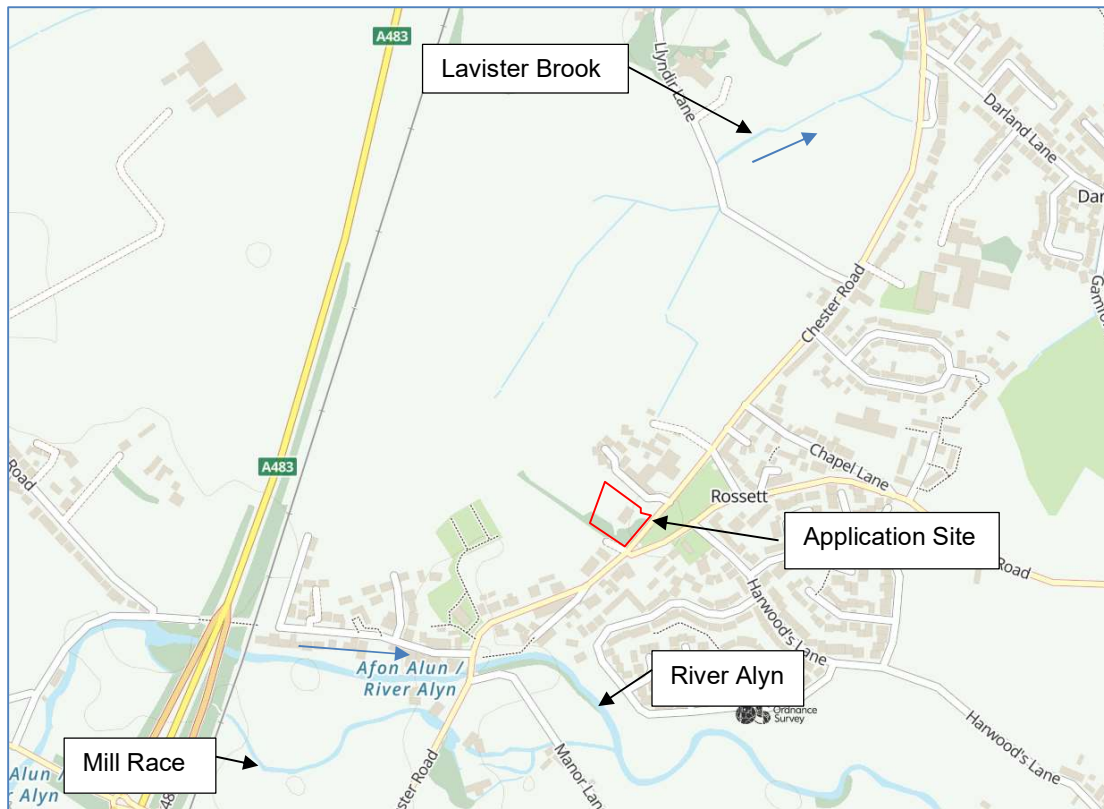


Figure 1. Local Hydrological Setting

1.7 Proposed Development

The proposed development comprises the demolition and replacement of the existing residential dwelling and the erection of nine additional dwellings at Tyn Y Coed. This FCA supports an outline planning application, with all matters reserved; an indicative proposed development plan is included as Appendix 3.

Figure 2 of Planning Policy Wales TAN15: Development and Flood Risk, confirms that residential dwellings are classified as 'highly vulnerable development', in flood risk terms. This is discussed further in Section 2.8.

2.0 FLOOD CONSEQUENCES ASSESSMENT

This section of the FCA reviews data from Natural Resources Wales (NRW), including the findings of the 2021 Rossett Flood Risk Study⁷, to identify potential sources of flooding within the application site. The following potential flood risk sources are considered: fluvial/tidal, surface water runoff, sewers/drains, groundwater, reservoir and infrastructure failure.

2.1 Fluvial/Tidal Flood Risk

Figure 2 presents an extract of NRW's online Development Advice Map, which indicates that the entire application site is located within Zone A, defined as land with little or no risk of fluvial or tidal/coastal flooding.



Figure 2 – NRW Development Advice Map

⁷ Natural Resources Wales, April 2021, Rossett Flood Risk Study, Final Report V2.0.

A revised TAN15 is due to be implemented in June 2023, which will be supported by NRW's new Flood Map for Planning. Whilst the Flood Map for Planning has no official status for planning purposes until June 2023, it is considered the most up to date national flood mapping. Figure 3 presents an extract of NRW's River Flood Map for Planning which indicates that the majority of the application site is located within low probability Flood Zone 1. Flood Zone 1 is defined as land with <0.1% annual probability of flooding from rivers or the sea, including the effects of climate change.

The north-western part of the site extends into defended Flood Zone 2, associated with the River Alyn. Flood Zone 2 is defined as land with between 0.1% and 1.0% annual probability of river flooding including the effects of climate change. However, this area is shown to benefit from the presence of local flood defences.

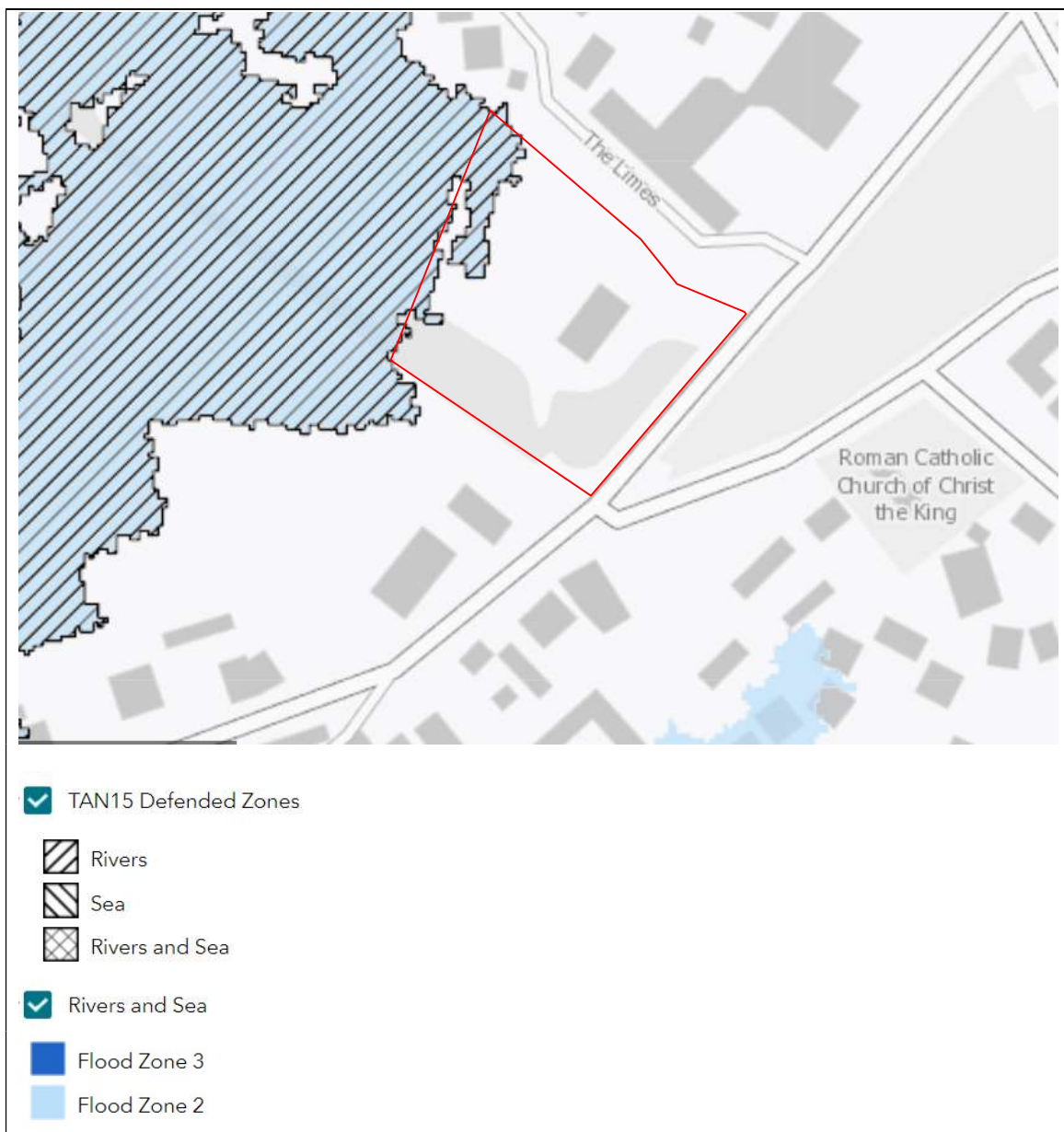


Figure 3. NRW Flood Map for Planning – Flood Risk from Rivers

NRW has been consulted for site-specific flood water level data; their response, dated 5th September 2022, included the flood study report and output from the updated 2021 River Alyn modelling study for Rossett⁷. The study included updated hydraulic modelling for the River Alyn at Rossett and an assessment of the level of protection provided by existing flood defences.

Figure 4 presents the predicted maximum flood extents for the River Alyn for a range of scenarios, from the 2021 Rossett Flood Risk Study, taking into account the presence of local flood defences. Figure 4 confirms that the application site remains outside of the predicted flood extent of all defended scenarios, up to and including the 1000 year (0.1% annual probability) flood event.

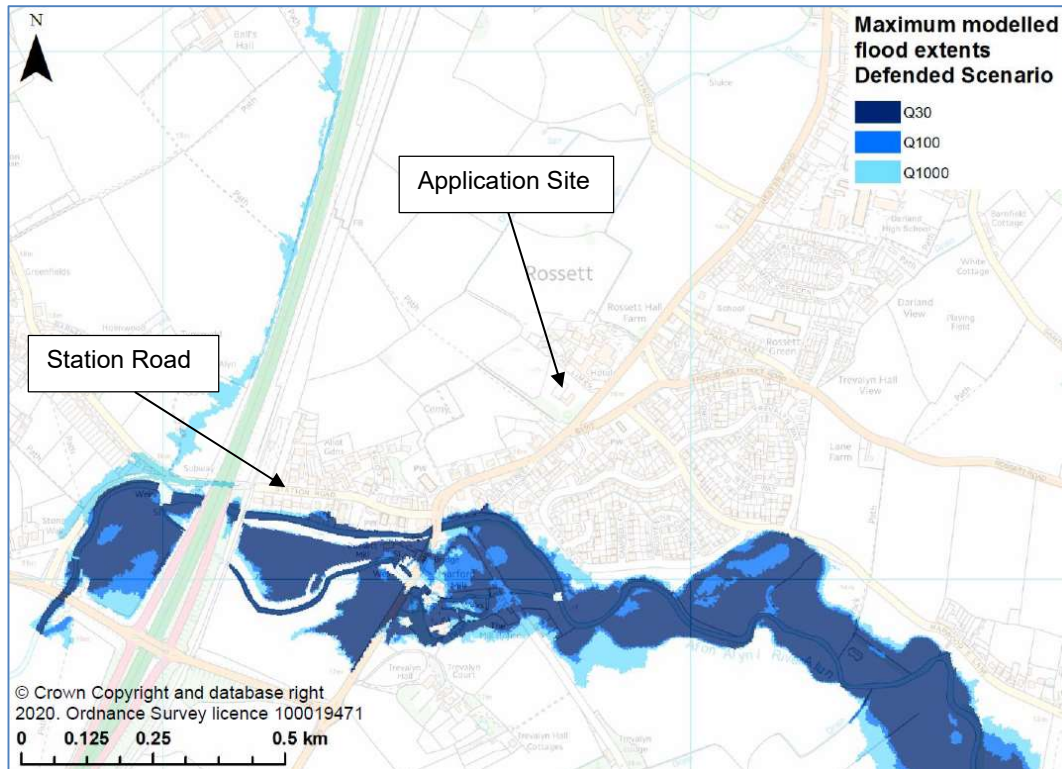


Figure 4. Predicted Maximum Modelled Flood Extents – Defended Scenario (extracted from NRW 2021 Rossett Flood Risk Study).

The Rossett Flood Risk Study report confirms that the main raised defences along Station Road (refer to Figure 4) offer protection during the 200 year (0.5% annual probability) flood event with >300mm of freeboard and for the 100 year (1.0% annual probability event) with >600mm of freeboard.

Figures 5 and 6 present the predicted maximum flood extents for the River Alyn, without the presence of flood defences, from the 2021 Rossett Flood Risk Study. It is evident that without defences in the hydraulic model, predicted flood water extents extend northwards, across Station Road towards the application site.

Figure 6 presents the predicted undefended flood zone extents focussed on the application site and confirms that the site remains outside of the flood extent for all scenarios. The predicted undefended 1000 year (0.1% annual probability) flood event extends up to the north-western corner of the application site but does not encroach into the site.

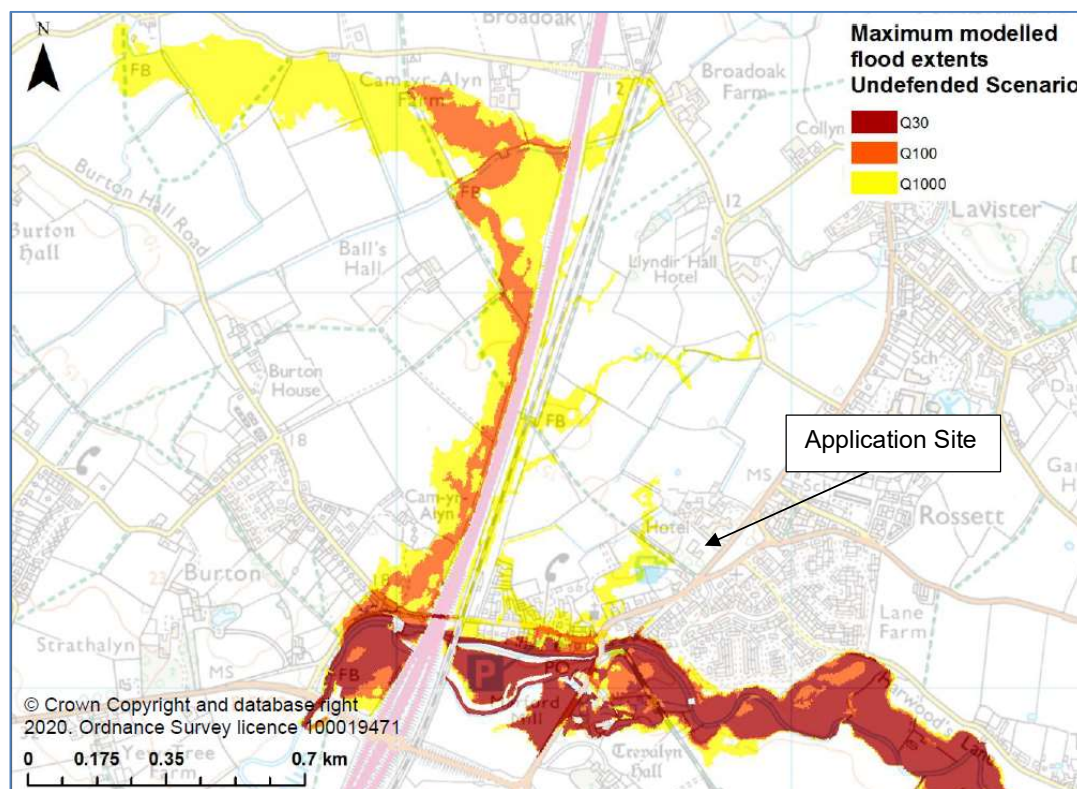


Figure 5. Predicted Maximum Modelled Flood Extents – Undefended Scenario (extracted from NRW 2021 Rossett Flood Risk Study).

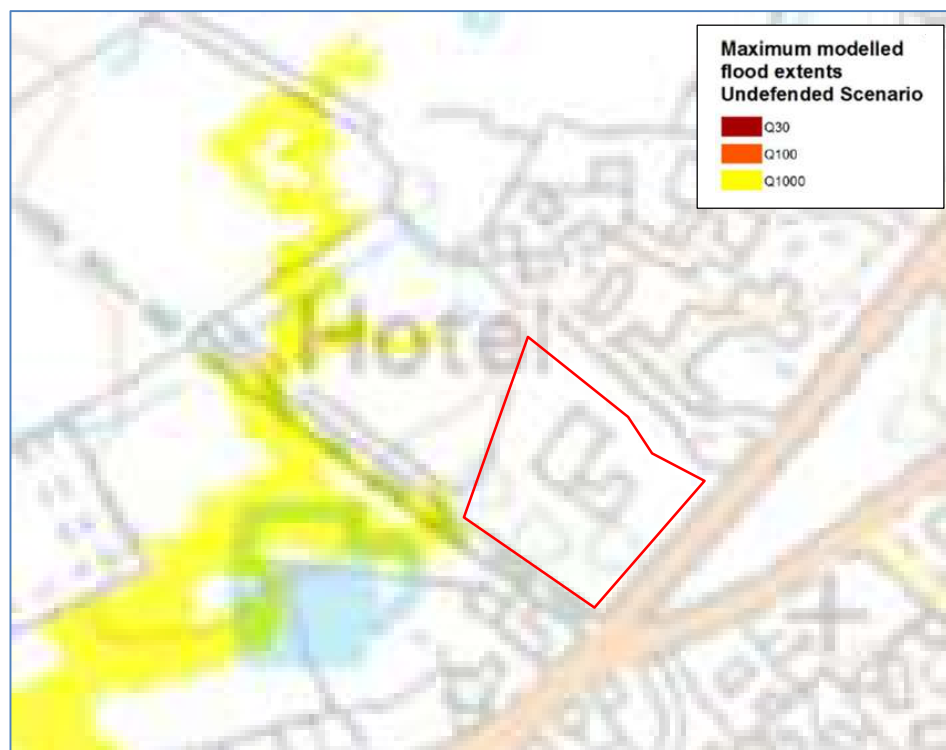


Figure 6. Predicted Maximum Modelled Flood Extents at the Application Site – Undefended Scenario (extracted from NRW 2021 Rossett Flood Risk Study).

Figures 7 and 8 present the predicted defended and undefended flood zone extents respectively, focussed on the application site, with 20% allowance for long-term climate change.

Climate change allowances are discussed in detail in Section 2.7 below, but a 20% allowance is appropriate for the lifetime of the proposed development. Therefore, Figure 7 presents the predicted fluvial flood extents throughout the lifetime of the development, with allowance for the existing flood defences.



Figure 7. Predicted Maximum Modelled Flood Extents at the Application Site – Defended Scenario + 20% Climate Change (extracted from NRW 2021 Rossett Flood Risk Study).

Figure 7 confirms that the application site remains outside of the predicted fluvial flood extents throughout the lifetime of the development, with allowance for climate change. Therefore, the site is entirely within low probability Flood Zone 1, throughout its lifetime, when local flood defences are taken into consideration.

Figure 8 presents the predicted fluvial flood extents throughout the lifetime of the development, ignoring the presence of local flood defences.

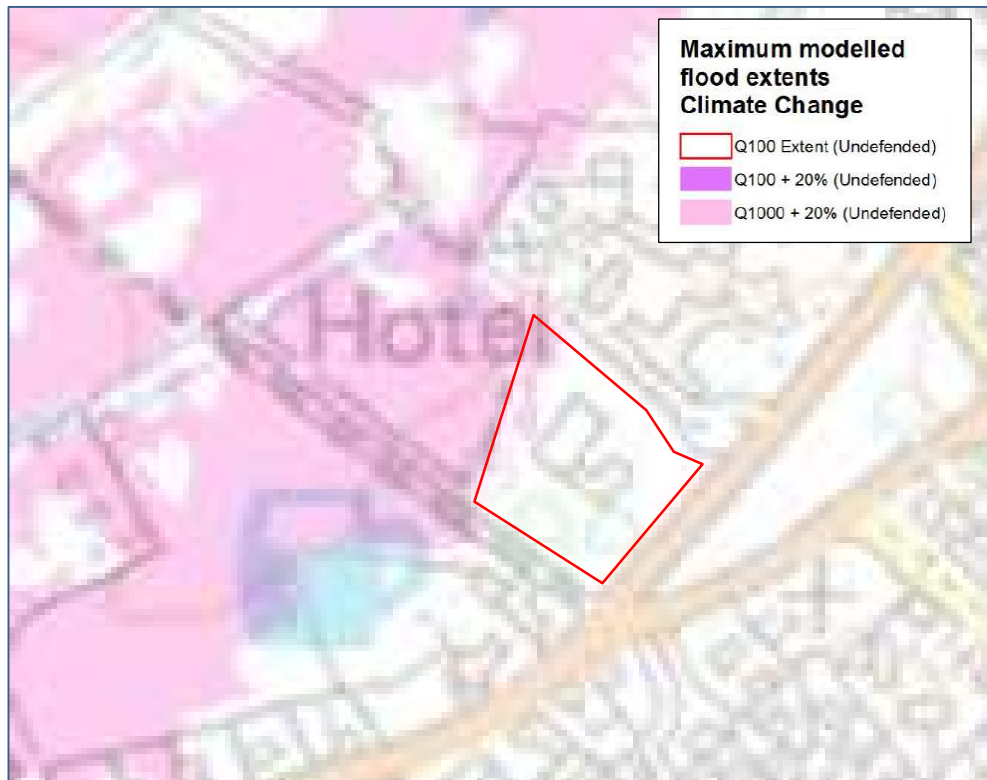


Figure 8. Predicted Maximum Modelled Flood Extents at the Application Site – Undefended Scenario + 20% Climate Change (extracted from NRW 2021 Rossett Flood Risk Study).

Figure 8 presents the undefended scenario, with allowance for climate change, ignoring the presence of local flood defences. Under this scenario, large areas in the south and west of Rossett are predicted to flood during the 1000 year (0.1% annual probability) flood event, with climate change. The predicted flood extent encroaches into the north-western part of the application site. NRW's Flood Map for Planning (Figure 3 above), is based on this undefended scenario, with allowance for long-term climate change.

Therefore, the output of the 2021 Rossett Flood Risk Study confirms that the application site has a very low probability of fluvial flooding (<0.1% annual probability) throughout the lifetime of the development, when local flood defences are taken into consideration.

There is a very low residual risk of flooding in the future, in the north-western part of the site, in the unlikely event of a breach of the local flood defences during the extreme flood event. However, it is reiterated that the worse-case, undefended scenario presented above assumes no flood defences are present at all, rather than a breach scenario.

Figure 8 confirms that the application site lies outside of the undefended 100 year (1.0% annual probability) flood extent with allowance for climate change and therefore remains outside the predicted Flood Zone 3 extent, throughout the lifetime of the development.

Review of the predicted future undefended Flood Zone 2 extent, with allowance for climate change (Figure 8) against the site topographic survey (Appendix 2), indicates a peak predicted flood water level within the north-western part of the application site of approximately 15.2mAOD during the 0.1% annual probability undefended scenario, with climate change. The location of the development, in flood risk terms, and the acceptability of the flood consequences are discussed below in Sections 2.9 and 2.10.

2.2 Surface Water Flood Risk

An extract of NRW's Flood Map for Planning indicating the risk of flooding from surface water and small watercourses is shown in Figure 9. This indicates that the entire application site lies within Flood Zone 1, defined as land with a very low risk (<0.1% annual probability) of flooding from surface water and small watercourses, with allowance for climate change.



Figure 9 – NRW Flood Map for Planning – Flood Risk from Surface Water and Small Watercourses

2.3 Flood Risk from Groundwater

The local ground conditions are detailed above in Section 1.5, with the application site shown to be underlain by superficial River Terrace Deposits (sand and gravel) and Glacial Till (diamicton), overlying interbedded mudstone, sandstone and conglomerate of the Carboniferous Salop Formation. Local published boreholes installed to a depth of 6.1mbgl did not encounter groundwater.

The presence of a relatively dense network of local drains and minor ordinary watercourses suggests low permeability ground conditions near surface, with the potential for shallow perched groundwater overlying low permeability layer(s). The potential for significant groundwater storage or flow is likely to be limited by the low permeability ground conditions.

No below-ground development is proposed and based on the available evidence, the risk of groundwater flooding to the development is considered low.

2.4 Flood Risk from Sewers and Drains

Welsh Water has provided a map of public sewers in the vicinity of the application site within their pre-planning enquiry response (refer to Appendix 4). This confirms the presence of a combined public sewer beneath Chester Road adjacent to the application site. Review of the site topographic survey confirms that in the event of any surcharge of this public sewer, local ground levels fall away from the manhole towards the north-east along Chester Road, away from the application site.

Therefore, the risk of flooding to the site from local sewers and drains is considered low.

2.5 Flood Risk from Reservoirs and Infrastructure Failure

Review of NRW's Flood Map for Planning confirms that the application site is not within the predicted flood extent of local reservoirs, in the unlikely event of reservoir failure.

2.6 Historic Flooding

Review of NRW's online historic flood map confirms there are no recorded flood events within or in the immediate vicinity of the application site.

2.7 Climate Change Allowances

The Welsh Government's latest guidance on climate change allowances (September 2021) confirms that rainfall and river levels are predicted to increase as a result of climate change, and this must be considered within development proposals.

The application site lies within the Dee River Basin District and Table 1 of the guidance confirms that peak river flows are predicted to increase by between 5% (lower end estimate) and 45% (upper end estimate) by the 2080s. The guidance confirms that the central estimate for the 2080s should be used to assess the potential impact of climate change within a FCA. For the Dee River Basin District, the central climate change estimate for the 2080s is 20%.

The predicted future flood extents from the Rossett Flood Study (Figures 7 and 8) include a 20% climate change allowance within their assessment of future fluvial flood risk. In addition, NRW's flood maps for planning, reproduced above, include allowance for long-term climate change in their assessment of flood risk from rivers, surface water and small watercourses.

The climate change allowances guidance also predicts that peak rainfall will increase by between 20% (central estimate) and 40% (upper estimate) by the 2080s, from 1961-1990 baseline data and confirms that drainage systems should be designed to ensure there is no increase in site run-off when assessed against the upper estimate.

A surface water drainage strategy will be required for the development and will incorporate an appropriate allowance for long-term climate change; this is discussed further in Section 3.2.

2.8 Flood Risk and Vulnerability

Figures 1 and 2 of TAN15: Development and Flood Risk set out the development advice flood zones and the vulnerability of developments to flooding

The following flood zones are defined in Figure 1 of TAN15:

Figure 1 – Development Advice Flood Zones	
Flood Zone	Description
A	Considered to be at little or no risk of fluvial or tidal/coastal flooding.
B	Areas known to have been flooded in the past evidenced by sedimentary deposits.
C	Based on Environment Agency extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal)
C1	Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.
C2	Areas of the floodplain without significant flood defence infrastructure.

The new TAN15 guidance on planning for flooding and coastal erosion will come into force on 1 June 2023 and is not therefore relevant to this planning application. However, NRW has advised the use of the latest Flood Map for Planning, which will accompany the revised TAN15 guidance. The Flood Map for Planning and 2021 Rossett Flood Study detailed in Section 2.1, indicates that the majority of the application site lies within Flood Zone A (Flood Zone 1 within the revised TAN15) but the north-western part of the site lies within a TAN15 Defended Zone, where flood risk management infrastructure provides an appropriate standard of protection against the 1000 year (0.1% annual probability) flood event with allowance for climate change.

Therefore, whilst the revised TAN15 does not apply until June 2023, this FCA considers the relevant aspects of the revised guidance with respect to defended flood zones.

Figure 2 of TAN15 sub-divides development into three categories, based on vulnerability to flooding:

Figure 2 - Development Vulnerability Classification

Development Category	Types
Emergency Services	hospitals, ambulance stations, fire stations, police stations, coastguard stations, command centres, emergency depots and buildings used to provide emergency shelter in time of flood
Highly Vulnerable Development	all residential premises (including hotels and caravan parks), public buildings (e.g. schools, libraries, leisure centres), especially vulnerable industrial development (e.g. power stations, chemical plants, incinerators), and waste disposal sites
Less Vulnerable Development	General industrial, employment, commercial and retail development, transport and utilities infrastructure, car parks, mineral extraction sites and associated processing facilities, excluding waste disposal sites

The proposed development comprises the demolition and replacement of an existing residential dwelling and the erection of nine additional dwellings and is therefore classified as highly vulnerable development.

2.9 Justifying the Location of Development

The majority of the application site lies within Flood Zone 1, the north-western part of the site encroaches into defended Flood Zone 2 (a TAN15 Defended Zone). This section of the FCA is based on the revised (June 2023) TAN15 guidance which confirms that all types of development are acceptable within Flood Zone 1.

Development will also be justified in the TAN 15 Defended Zone if:

1. Its location meets the definition of previously developed land; and
2. The potential consequences of a flooding event for the particular type of development have been considered and found to be acceptable in accordance with the criteria contained in section 11 of TAN15.

The application site comprises the dwelling and curtilage of Tyn Y Coed and therefore comprises previously developed land. The potential consequences of flooding are assessed below.

2.10 Assessing the Consequences of Flooding

In accordance with the revised (June 2023) TAN15, this FCA aims to establish if suitable avoidance and mitigation measures can be incorporated within the site design to ensure that development is safe and there is:

- minimal risk to life;
- minimal disruption to people living and working in the area;
- minimal potential damage to property;
- minimal impact of the proposed development on flood risk generally; and
- minimal disruption to the sustainable management of natural resources

Section 11 of the revised TAN15 confirms that all development must be designed to be flood free during the 1% annual probability river flood, with allowance for climate change. Figures 7 and 8 above present output from the 2021 Rossett Flood Study which confirms that the application site is predicted to remain safe and dry during the 1% annual probability flood event, with allowance for climate change. This remains the case for the defended and undefended scenario, with the application site entirely outside of the future Flood Zone 3 extent.

Therefore, the development meets the required flood free threshold.

However, it is recognised that there is a residual risk of flood water encroaching into the north-western part of the application site during the extreme, 0.1% annual probability flood event, with allowance for climate change, in the undefended scenario. The peak predicted flood water level under this scenario is approximately 15.2mAOD, equivalent to a peak flood water depth of <300mm. The application site is on the limit of the predicted flood extent, approximately 250m from the River Alyn, within an area of relatively flat-lying ground, therefore it is inferred that predicted flood water velocities would be relatively low and below the 0.15m/s threshold. Therefore, the predicted worse-case flood conditions in the north-western part of the application site during the 0.1% annual probability flood event plus climate change (ignoring the presence of flood defences) are within the tolerable conditions for highly vulnerable development, presented within the revised TAN15.

It is reiterated that the application site benefits from local flood defences which ensure the development would remain safe and dry during the 0.1% annual probability flood event plus climate change. The above assessment of tolerable conditions in an extreme flood event relates to the undefended scenario, with no flood defences present and is therefore extremely unlikely.

However, Figure 1 of the revised TAN15 guidance states that for TAN15 Defended Zones, the acceptability criteria are:

- requirement for appropriate surface water management;
- acceptable consequences for type of use;
- agreement for construction and maintenance costs secured;
- occupiers aware of flood risk;
- escape/evacuation routes present;
- flood emergency plans and procedures;
- flood resistant and resilient design; and
- no increase in flooding elsewhere.

The proposed flood risk management measures for the development are outlined in Section 3.

3.0 PROPOSED FLOOD RISK MITIGATION MEASURES

3.1 Fluvial Flood Risk Mitigation Measures

This FCA supports an outline planning application only, therefore the indicative layout presented in Appendix 3 is subject to change and confirmation. Section 2 of the FCA confirms that the application site benefits from local flood defences and remains at very low risk (<0.1% annual probability) of fluvial flooding throughout its lifetime, with allowance for climate change. The north-western part of the application site extends into Flood Zone 2 (0.1% to 1.0% annual probability of flooding), for the undefended scenario (i.e. ignoring the presence of local flood defences) when long-term climate change is taken into consideration.

This FCA has demonstrated that the proposed development meets the required flood free threshold and is within the tolerable conditions for highly vulnerable development.

However, it is recommended that the following fluvial flood risk mitigation measures be incorporated into the final layout design:

Site Layout

Where feasible, all highly vulnerable development (i.e. residential dwellings) should be located outside of the defended Flood Zone 2 extent. Development within the defended flood zone should be limited to gardens, parking and other open space, where feasible.

Flood Warning & Evacuation Plan

It is recommended that a Flood Warning and Evacuation Plan be prepared for the development and form part of the Deeds of the properties. The document would present a summary of the flood risk to the development, the benefit of local flood defences and confirm that the development has a very low residual risk of flooding in the event of failure of the defences only. The application site does not lie within an NRW flood warning or flood alert area.

The document would confirm that safe access and egress is available to the site, during extreme flood events, via Chester Road, in a northerly direction.

Flood Resistant Design

The predicted peak flood water level for the undefended, extreme (0.1% annual probability) flood event plus climate change is approximately 15.2mAOD; this equates to peak flood water depths, in the north-western part of the application site only, of <300mm. Therefore, it is recommended that finished floor levels be raised above 15.2mAOD.

Where this is not feasible and in accordance with current guidance, it is recommended that measures be taken to keep flood water out, through flood resistant design. Flood resistant design techniques should be introduced within the building, in accordance with current guidance⁸, such as the use of impermeable building materials and flood doors, to a minimum elevation of 15.2mAOD.

⁸ Environment Agency, May 2007, Improving the flood performance of new buildings – Flood resilient construction.

3.2 Surface Water Management

It is recognised that new development has the potential to increase surface water runoff rates and volumes, through the introduction of impermeable surfaces, which, in the absence of appropriate mitigation, can increase flood risk to others.

On 7th January 2019, the Welsh Government introduced Schedule 3 of the Flood and Water Management Act 2010, which aims to ensure sustainable drainage systems (SuDS) are considered and utilised to manage surface water on new developments.

All new development of more than one building or where the construction area exceeds 100m² require a SuDS scheme. The SuDS scheme must be designed and built in accordance with the national statutory standards⁹ and must be approved by the local SuDS Approving Body (SAB). Wrexham County Borough Council is the relevant SAB for the application site; SAB approval must be obtained alongside relevant planning permission, prior to construction commencing.

This FCA supports an outline planning application only; a detailed sustainable drainage strategy shall be prepared for the final development layout. This section of the FCA presents the design standards and additional work required to inform the subsequent drainage strategy.

3.2.1 Surface Water Runoff Destination and Design Standard

In accordance with the national SuDS standards, surface water runoff should be discharged as far up the following hierarchy as possible:

1. collected for use;
2. infiltrated to ground;
3. discharged to a surface water body;
4. discharged to a surface water sewer;
5. discharged to a combined sewer.

The potential to use surface water runoff within the development is limited, although water butts should be introduced on roof drainage downpipes. Any benefit provided by such systems is limited and should not be considered within the overall drainage strategy.

The potential to infiltrate surface water runoff to ground is likely to be limited by the low permeability ground conditions anticipated within the application site. However, this should be confirmed through site-specific infiltration testing (in accordance with BRE Digest 365), within the location(s) of proposed infiltration features and confirmation of depth to groundwater.

Assuming infiltration drainage is not viable, there are no surface water bodies or surface water sewers in the immediate vicinity of the application site, therefore surface water runoff would be required to discharge to the combined sewer in Chester Road (refer to Appendix 4).

Welsh Water has confirmed¹⁰ that discharge to the combined sewer will only be permitted where all other options higher up the discharge hierarchy are not viable and where there is

⁹ Welsh Government, 2018, Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems.

¹⁰ Email dated 9th September 2022 from Jake MacMillan, Development Control Officer, Welsh Water.

clear evidence that the existing dwelling discharges surface water to the combined sewer. Welsh Water has also confirmed that a significant betterment must be achieved (i.e. the proposed discharge rate to the sewer from the development must be significantly lower than existing).

Therefore, if infiltration drainage is not viable, a drainage survey should be undertaken of the existing drainage arrangements to confirm connection to the public sewer, to confirm the connection manhole invert level and to allow modelling of the current drainage to confirm existing peak discharge rates.

The drainage system should be designed to accommodate the 100 year (1% annual probability) rainfall event, with allowance for climate change, with no on-site flooding. If runoff is discharged to the combined sewer, on-site attenuation shall be required to provide a degree of betterment (i.e. a reduction from the existing discharge rate), which should be agreed with Welsh Water.

3.2.1 SuDS Options

Following on-site infiltration testing and a drainage survey (if appropriate), the SuDS scheme should be designed in accordance with the national standards to provide appropriate hydraulic control, water quality, amenity and biodiversity benefits, with due consideration for the operation and maintenance requirements.

SuDS elements should be chosen based on the site characteristics, constraints and the proposed discharge route, with individual elements designed in accordance with the SuDS Manual¹¹. Appropriate SuDS elements are likely to include: permeable paving to driveways with below-ground storage (and infiltration if viable) and additional below-ground attenuation storage (e.g. below the internal access road), if required.

The drainage strategy should be prepared in consultation with Welsh Water and the SAB.

¹¹ CIRIA, 2015, The SuDS Manual, Report C753.

4.0 SUMMARY AND CONCLUSIONS

This report represents a site-specific Flood Consequences Assessment to support an outline planning application for the replacement of the existing residential dwelling and the erection of nine additional dwellings at Tyn Y Coed, Chester Road, Rossett LL12 0DE.

NRW's current development advice map indicates that the entire application site lies within Flood Zone A, where there are no constraints to development. However, NRW has confirmed that their Flood Map for Planning presents the most up to date flood risk information and indicates that the north-western part of the site extends into defended Flood Zone 2.

A review of all potential sources of flooding to the application site has been undertaken and NRW has been consulted to obtain site-specific predicted flood risk information. The FCA concludes that the only significant potential source of flooding to the development is fluvial flooding from the River Alyn.

Site-specific predicted flood extents have been obtained from NRW's 2021 Rossett Flood Study. The updated hydraulic modelling confirms that the application site remains outside the predicted flood extents of the River Alyn, with allowance for long-term climate change, due to the presence of local flood defences. However, for the undefended scenario, which ignores the presence of flood defences, the north-western part of the application site extends into the predicted flood extent for the 0.1% annual probability event, with climate change. Therefore, there is a very low residual risk of flooding to the north-western part of the application site, in the event of flood defence failure during the extreme flood event. The predicted peak flood water level within the application site, during this extreme 0.1% annual probability undefended flood event, plus climate change, is approximately 15.2mAOD.

Whilst the revised Flood Map for Planning and associated TAN15 do not apply until June 2023, this FCA confirms that the location of the development meets the requirements of the revised TAN15. The required flood free threshold is achieved, with no reliance on flood defences, and the predicted worse-case flood conditions in the north-western part of the application site during the undefended 0.1% annual probability flood event plus climate change, are within the tolerable conditions for highly vulnerable development.

However, in accordance with the revised TAN15, appropriate flood risk mitigation measures are proposed to ensure that the consequences of flooding are acceptable. These include:

- Considering flood risk within the final development layout, to minimise the footprint of highly vulnerable development within the defended flood extent in the north-western part of the application site
- Preparation of a Flood Warning & Evacuation Plan for future owners/occupiers to clarify the flood risk to the development, the benefit of local flood defences and the safe access/egress route via Chester Road. It is noted that the application site is not within an NRW flood alert or flood warning area.
- Raising finished floor levels above 15.2mAOD where feasible. If this is not feasible, attempts should be made to exclude flood water to a minimum height of 15.2mAOD through the introduction of impermeable building materials and flood doors.

In addition, a sustainable drainage strategy should be prepared once the final development layout is agreed, in accordance with the national SuDS standards. The drainage strategy will require SAB approval prior to construction commencing.

The proposed development benefits from flood defences and will not change the existing flood risk vulnerability classification of the land use. Therefore, with the proposed mitigation

measures, this FCA concludes that the proposed residential development at Tyn Y Coed, Rossett, is appropriate and sustainable with regards to flood risk.

5.0 CLOSURE

This report has been prepared by Nicola Sugg (trading style of NSugg Limited) with all reasonable skill and care, and in accordance with the services agreed with Fiona McClements. Relevant information provided by Fiona McClements and MDG Design has been accepted in good faith as being accurate and valid. This report is based on the relevant guidance and legislation in force at the date of the report and should be reviewed if such guidance and legislation are amended or superseded.

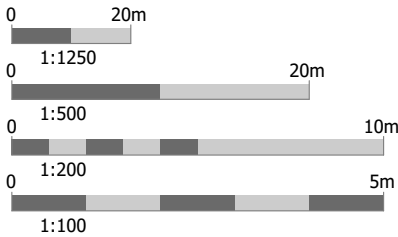
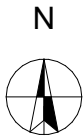
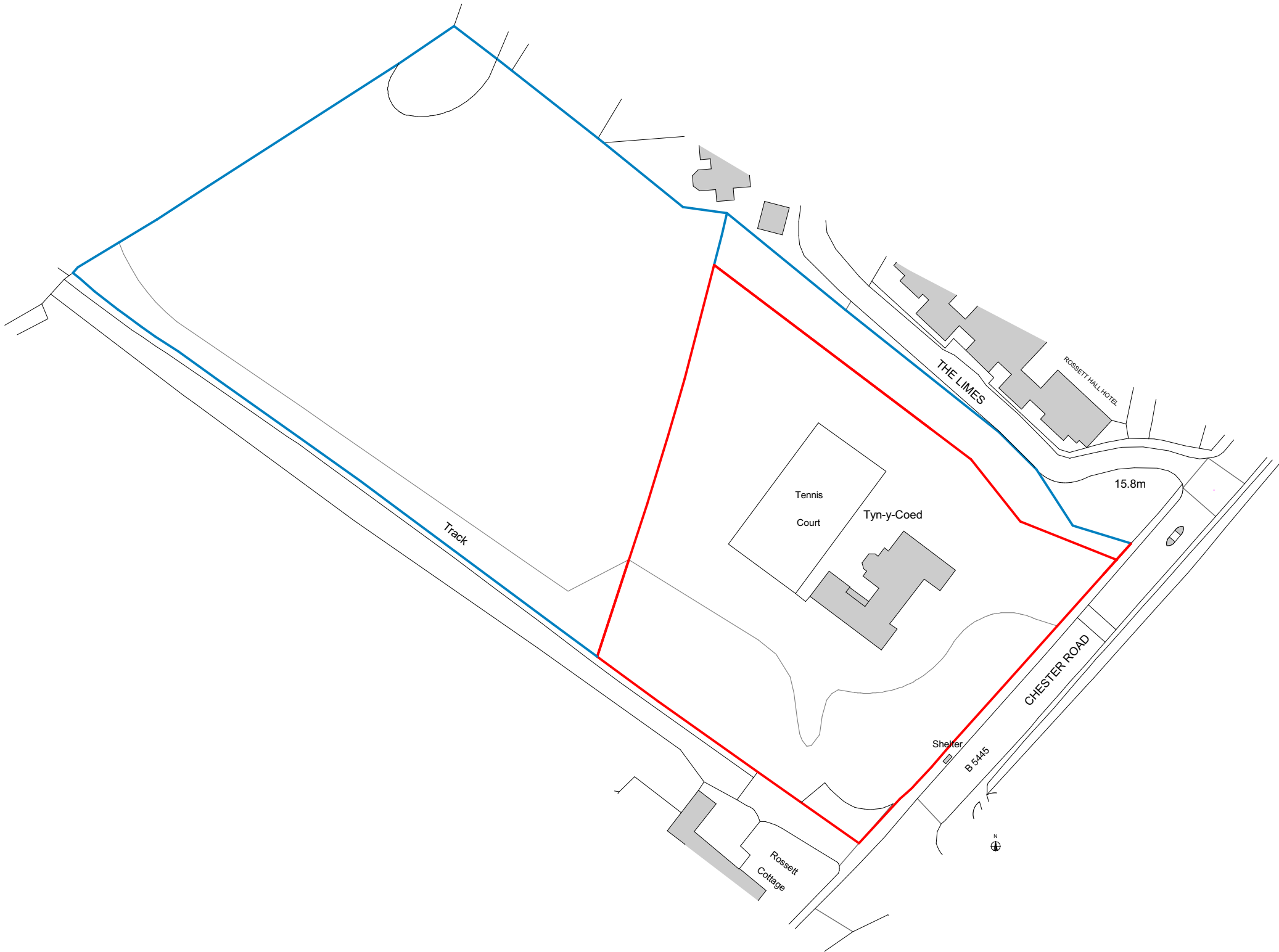
This report is for the exclusive use of Fiona McClements and MDG Design; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Nicola Sugg.

NSugg Ltd do not warrant that the advice in this report will guarantee the availability of flood insurance either now or in the future.

It will be the owner's /occupier's responsibility to ensure the recommended flood risk mitigation measures outlined within this FCA are implemented and to maintain the site drainage system throughout the lifetime of the development.

APPENDIX 1

Do not scale from drawing, use
figured dimensions & levels only.
All dimensions & levels to be
checked on site before commencing
work and any discrepancies to be
notified to C.A. immediately. If in
doubt ask ?



rev	comments	initials	date
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mdg

architects
interior designers
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quantity surveyors
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w: www.mdg.design

client

project
Tyn Y Coed Chester Road Rossett WREXHAM LL12 0DE

content
LOCATION PLAN

scale 1:1000	sheet A3	date	drawn by	checked
project number 248-07	drawing number PL(00)01			rev
purpose of issue				

APPENDIX 2

Indicative

[illegible]

_____ Building
 _____ Building overhead / Foundations / Ruins
 _____ Road edge / Change of surface / Drain
 _____ Change of slope
 _____ Fence

	Safety barrier		
	Overhead cable	+	Stile
	Gate		
	Hedge		Tree
	Limit of foliage/tree canopies	52.47	Spot level

o-ordinates and Levels related to Ordnance Survey
National Grid and Datum using Leica's GS08+ dual
frequency GNSS receiver and SmartNet RTK corrections.

Station	Eastings	Northings	Level
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	336752.182	357332.742	16.123
	336762.152	357283.342	16.156
	336835.389	357351.090	15.881
	336755.357	357409.910	14.974
	336782.028	357335.040	15.569
	336787.397	357359.136	15.687
	336748.990	357390.212	15.199
	336726.987	357334.480	15.430
	336757.835	357347.603	15.417
	336784.762	357287.493	16.126

W	DESCRIPTION	DWN	CHKD	DATE
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CLIENT Fiona McClements

PROJECT	Tyn Y Coed
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TITLE Topographical Survey

WV	DATE	CHK'D	DATE	APP'D	DATE	SCALE
B	15/11/2002					1-200@A



Drawing Number	MBS972	A0 REV
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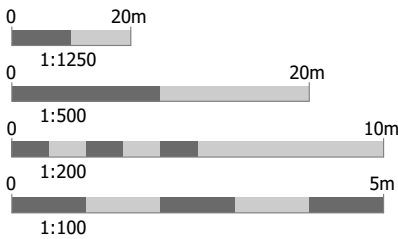
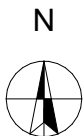
APPENDIX 3



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All dimensions & levels to be
checked on site before commencing
work and any discrepancies to be
notified to C.A. immediately. If in
doubt ask ?



ALL LAYOUTS INDICATIVE
AND SUBJECT TO
RESERVED MATTERS /
FULL APPLICATION.



A GENERAL AMENDMENTS			
rev	comments	initials	date

mdg

architects
interior designers
strategy planners
quantity surveyors
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w: www.mdg.design

client

project
Tyn Y Coed Chester Road Rossett WREXHAM LL12 0DE

content
PROPOSED SITE PLAN
(INDICATIVE)

scale 1:500	sheet A3	date	drawn by	checked
project number 248-07	drawing number PL(00)03			rev
purpose of issue				

APPENDIX 4

Ms Fiona McClements
Dunham House
Dunham Hill
Frodsham
Cheshire
WA6 0NQ

Date: 01/09/2022
Our Ref: PPA0007107

Dear Ms McClements,

Grid Ref: 336758 357351

Site Address: Tyn Y Coed, Chester Road, Rossett

Development: Demolition of existing property and erection of 10 replacement dwellings.

I refer to your pre-planning enquiry received relating to the above site, seeking our views on the capacity of our network of assets and infrastructure to accommodate your proposed development. Having reviewed the details submitted I can provide the following comments which should be taken into account within any future planning application for the development.

Firstly, we note that the proposal relates to 10 replacement dwellings at Tyn Y Coed and acknowledge that the site comprises of a potential windfall development with no allocated status in the Local Development Plan (LDP). Accordingly, whilst it does not appear an assessment has been previously undertaken of the public sewerage and watermains systems, we offer the following comments as part of our appraisal of this development.

Public Sewerage Network

The proposed development site is located in the immediate vicinity of a predominantly combined public sewerage system which drains to Lavister Wastewater Treatment Works (WwTW).

Asset Protection

You are also advised that some public sewers and lateral drains may not be recorded on our maps of public sewers because they were originally privately owned and were transferred into public ownership by nature of the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The presence of such assets may affect the proposal.

In order to assist you may contact Dwr Cymru Welsh Water on 0800 085 3968 to establish the location and status of the apparatus in and around your site. Please be mindful that under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times.

Surface Water Drainage

As of 7th January 2019, this proposed development is subject to Schedule 3 of the Flood and Water Management Act 2010. The development therefore requires approval of Sustainable Drainage Systems (SuDS) features, in accordance with the 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems'. As highlighted in these standards, the developer is required to explore and fully exhaust all surface water drainage options in accordance with a hierarchy which states that discharge to a combined sewer shall only be made as a last resort. Disposal should be made through the hierarchical approach, preferring infiltration and, where infiltration is not possible, disposal to a surface water drainage body in liaison with the Land Drainage Authority and/or Natural Resources Wales.

It is therefore recommended that the developer consult with Wrexham Council, as the determining SuDS Approval Body (SAB), in relation to their proposals for SuDS features. Please note, DCWW is a statutory consultee to the SAB application process and will provide comments to any SuDS proposals by response to SAB consultation.

In addition, please note that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system.

Foul Water Drainage – Sewerage Network

We have considered the impact of foul flows generated by the proposed development and concluded that flows can be accommodated within the public sewerage system. We advise that the flows should be connected to the combined sewer at or downstream of manhole SJ36578398 located in Chester Road. Should a planning application be submitted for this development we will seek to control these points of communication via appropriate planning conditions and therefore recommend that any drainage layout or strategy submitted as part of your application takes this into account. However, should you wish for an alternative connection point to be considered please provide further information to us in the form of a drainage strategy, preferably in advance of a planning application being submitted.



Welsh Water is owned by Glas Cymru – a 'not-for-profit' company.
Mae Dwr Cymru yn eiddo i Glas Cymru – cwmni 'nid-er-elw'.

We welcome correspondence in
Welsh and English

Dŵr Cymru Cyf, a limited company registered in
Wales no 2366777. Registered office: Pentwyn Road,
Nelson, Treharris, Mid Glamorgan CF46 6LY

Rydym yn croesawu gohebiaeth yn y
Gymraeg neu yn Saesneg

Dŵr Cymru Cyf, cwmni cyfyngedig wedi'i gofrestru yng
Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn
Nelson, Treharris, Morgannwg Ganol CF46 6LY.

You may need to apply to Dwr Cymru Welsh Water for any connection to the public sewer under Section 106 of the Water industry Act 1991. However, if the connection to the public sewer network is either via a lateral drain (i.e. a drain which extends beyond the connecting property boundary) or via a new sewer (i.e. serves more than one property), it is now a mandatory requirement to first enter into a Section 104 Adoption Agreement (Water Industry Act 1991). The design of the sewers and lateral drains must also conform to the Welsh Ministers Standards for Foul Sewers and Lateral Drains, and conform with the publication "Sewers for Adoption"- 7th Edition. Further information can be obtained via the Developer Services pages of www.dwrcymru.com.

Foul Water Drainage – Sewage Treatment

Please note that the Natural Resources Wales have recently released Planning Advice relating to increased phosphate levels in several river Special Areas of Conservation (SAC). Applications for new development in these areas need to consider the requirements set out in the planning advice and should form part of the local planning authority's decision making when determining planning applications. The flows from this development would eventually drain to our Lavister Wastewater Treatment Works which has a phosphate consent.

No problems are envisaged with the Waste Water Treatment Works for the treatment of domestic discharges from this site.

I trust the above information is helpful and will assist you in forming water and drainage strategies that should accompany any future planning application. I also attach copies of our water and sewer extract plans for the area, and a copy of our Planning Guidance Note which provides further information on our approach to the planning process, making connections to our systems and ensuring any existing public assets or infrastructure located within new development sites are protected.

Please note that our response is based on the information provided in your enquiry and should the information change we reserve the right to make a new representation. Should you have any queries or wish to discuss any aspect of our response please do not hesitate to contact our dedicated team of planning officers, either on 0800 917 2652 or via email at developer.services@dwrcymru.com

Please quote our reference number in all communications and correspondence.

Yours faithfully,



Owain George
Planning Liaison Manager
Developer Services



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Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn
Nelson, Treheris, Morgannwg Ganol CF46 6LY.

Please Note that demands upon the water and sewerage systems change continually; consequently the information given above should be regarded as reliable for a maximum period of 12 months from the date of this letter.



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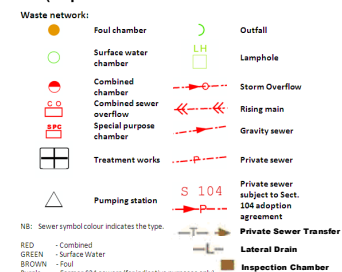
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Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn
Nelson, Treharris, Morgannwg Ganol CF46 6LY.



PPA0007107 Public Sewer Record



LEGEND(Representative of most common features)



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.

Dier-Cynry Cyllyngedig (The Company) gives this information as to the position of its underground apparatus by way of general guidance only and it is 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 usual 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 193 and 190 of the Water Industry Act 1961 and the Regulations made thereunder. It is stressed that the Company does not purport to be responsible for any damage, fire, flooding, etc., which may result from any excavation made without regard to the provisions of the said Act and Regulations. 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 1969, or if they do, the particular details of such apparatus 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, or the Company's right to be compensated for any damage to its apparatus.

Service sites are not necessarily shown but their existence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS
TO BE DETERMINED ON SITE.

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Map Ref: 336783,357331
Map scale: 1:960
Printed by: Jeremy Hackman
Printed on: 01 Sep 2022



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