

# AMBIENTAL

## ENVIRONMENTAL ASSESSMENT

---

### Flood Consequence Assessment 4447

34 Wellington Road,  
Rhyl,  
LL18 1BN

---

## Document Issue Record

**Project:** Phase 1 Flood Consequence Assessment (FCA)

**Prepared for:** Brighter Futures

**Reference:** 4447 FCA

**Site Location:** 34 Wellington Road, Rhyl, LL18 1BN

**Proposed Development:** It is understood that the development is for the conversion of a vacant public house to a community centre.

Consultant		Date	Signature
<b>Author</b>	Sebastian Wyer	15/04/2019	
<b>Document Check</b>	Thea Powell	16/04/2019	
<b>Authorisation</b>	Mark Naumann	16/04/2019	

### Please Note:

This report has been prepared for the exclusive use of the commissioning party and may not be reproduced without prior written permission from Ambiental Environmental Assessment. All work has been carried out within the terms of the brief using all reasonable skill, care and diligence. No liability is accepted by AMBIENTAL for the accuracy of data or opinions provided by others in the preparation of this report, or for any use of this report other than for the purpose for which it was produced.

### Contact Us:

Ambiental Environmental Assessment  
 Sussex Innovation Centre,  
 Science Park Square,  
 Brighton, BN1 9SB

[www.ambiental.co.uk](http://www.ambiental.co.uk)

UK Office: +44 (0) 203 857 8540 or +44 (0) 203 857 8530

## Contents

<b>1.</b>	<b>Summary</b> .....	<b>3</b>
<b>2.</b>	<b>Development Description and Site Area</b> .....	<b>6</b>
	<i>Proposed Development and Location</i> .....	6
	<i>Vulnerability Classification</i> .....	7
	<i>Geology</i> .....	8
<b>3.</b>	<b>Justifying the Location of Development</b> .....	<b>9</b>
<b>4.</b>	<b>Site Flood Hazards</b> .....	<b>10</b>
	<i>Sources of Flooding</i> .....	10
	<i>Mechanisms and History of Flooding</i> .....	10
	<i>Tidal</i> .....	10
	<i>Surface Water (Pluvial)</i> .....	12
	<i>Groundwater</i> .....	13
	<i>Sewer</i> .....	14
	<i>Surface Water Drainage Strategy</i> .....	15
	<i>Records of Historical Flooding</i> .....	15
<b>5.</b>	<b>Probability of Flooding</b> .....	<b>16</b>
	<i>Flood Zones</i> .....	16
	<i>Climate Change on Site</i> .....	16
<b>6.</b>	<b>Residual Risks</b> .....	<b>17</b>
	<i>Identification of Residual Risks</i> .....	17
	<i>Defence Breach</i> .....	17
	<i>Reservoir Failure</i> .....	20
	<i>Drainage Exceedance</i> .....	20
<b>7.</b>	<b>Flood Risk Management Measures</b> .....	<b>21</b>
	<i>Flood Risks</i> .....	21
	<i>Flood Warning Service</i> .....	21
	<i>Flood Evacuation Plan</i> .....	23
<b>8.</b>	<b>Off Site Impacts</b> .....	<b>26</b>
	<i>Impact to Flood Risk Elsewhere</i> .....	26
	<i>Generation of Runoff</i> .....	26
<b>9.</b>	<b>Conclusion</b> .....	<b>27</b>
	<b>Appendix I - Site Plans</b>	
	<b>Appendix II - NRW Data</b>	

## 1. Summary

- 1.1 Ambiental Environmental Assessment has been appointed by Brighter Futures to undertake a Technical Advice Note 15 (TAN15) compliant Flood Consequence Assessment (FCA) for the proposed development at 34 Wellington Road, Rhyl, LL18 1BN.
- 1.2 The site is currently a vacant commercial property (previously a Public House). It is understood that the development is for the conversion of a vacant public house to a community centre.
- 1.3 With reference to the Natural Resources Wales (NRW) Development Advice Map, the proposed development is located within Flood Zone C1 (areas of the floodplain served by significant defence infrastructure). According to the NRW detailed online maps, the site also falls within Flood Zone 2 (with a greater than 0.1% chance of annual fluvial flooding) and Flood Zone 3 (with a greater than 1% chance of annual fluvial flooding).
- 1.4 The proposed development is considered “Highly Vulnerable” under the TAN15 development category types, therefore there is a requirement to justify highly vulnerable development within Zone C1. The following should be noted:
  - Policy BSC 2 of the Denbighshire Adopted Local Plan states that brownfield development should be prioritised. It is considered important to emphasise redevelopment of brownfield sites, where possible, in line with wider objectives for regeneration in the North Wales Coast Strategic Regeneration Area.
  - The community centre will address the objectives set out in the Denbighshire Adopted Local plan for (PSE8) states *‘We also need to improve the environment around these homes to create a sense of neighborhood and community. To achieve this in a time of significant public sector financial constraints, we will need to promote community engagement in civic initiatives to improve local places and amenities.’*
  - The site is defended. The topographic levels/defence heights across the frontage of Rhyl have been shown to be higher than modelled still water flood levels, and therefore the site has been shown to not flood during the 200+CC tidal flood events.
  - The North West England and North Wales Shoreline Management Plan (2012) shows that the defences benefitting the site are classed as ‘hold the line’ and are expected to be upgraded and maintained for the foreseeable future.
  - Therefore, the risk of flooding to the site is residual as a result of failure of the defences.
  - The existing public house on site is classified as ‘highly vulnerable’. The proposed conversion to community centre (highly vulnerable) will not increase the vulnerability on site. Furthermore, the proposed community centre will not increase the number of people located within a flood risk area compared to the existing public house.
  - The residual risk of breach can be appropriately managed by early warning systems and closing the community centre upon receipt of a flood warning and by implementing flood resilience measures to ensure the community centre can recover from a flood event in a quick and efficient manner.
- 1.5 NRW have provided flood levels for the 1:200 year return period (RP) tidal flood event (including various epochs of sea level rise). This data shows the site to be partially inundated by levels of less than 0.19m for the present day 200 year RP respectively. For the 2111 epoch, the 200 year RP tidal flood level is increased to 6.38mAOD which corresponds to a maximum flood depth of 0.79m.

- 1.6 However, it should be noted that these flood levels provided are simply extreme still water levels. As demonstrated within Figure 7, the topographic levels across the frontage of Rhyl are higher than this still water level. Furthermore, the site is located within Flood Zone C1, which is defined as an area served by significant defence infrastructure. **Therefore, it is highly unlikely that the proposed development will be affected by these still water flood levels. The main risk of flooding to the site would be in the event of breach/failure of defences.**
- 1.7 The risk of flooding to the site from surface water and sewer flooding is deemed to be relatively low, whilst the risk of flooding to the site from groundwater is deemed to be relatively low to moderate. To mitigate these sources of flooding, a number of measures have been recommended to manage the associated risks.
- 1.8 There will be a negligible change in the built footprint as a result of the proposed development, as the application is for a 'change of use'.
- 1.9 As there is no material amendment to the main buildings on site and existing drainage serves the existing property it is recommended that the site developer discharge runoff generated by the proposed development via the existing drainage network.
- 1.10 As the site is located in an NRW Flood Alert Area, it should be possible to achieve prior evacuation in the event of a flood. In addition to this, as stated earlier, due to the nature of tidal flooding NRW aim to provide at least 6 hours lead time for flood warnings. As such, the importance of the site owner signing up to this service is once again reinforced.
- 1.11 As part of the assessment the primary risk of flooding was found to be residual as a result of breach/failure of the flood defences. Given the unexpected nature of a breach event, it is highly recommended that upon receipt of a flood warning the community centre is closed and vacated. The community centre should not be reopened until the flood warning has been lifted or has been deemed safe by emergency services.
- 1.12 As such, the following mitigation measures are recommended:
- all plumbing insulation to be of closed-cell design;
  - non-return valves to be fitted to drain and sewer outlets;
  - anti-syphon fitted to all toilets;
  - the proposed development is located within an NRW Flood Alert Service Area. Management staff will be required to sign up to this service.

Following the guidelines contained within the TAN15, the proposed development is considered to be suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Development Description	Existing	Proposed
<b>Development Type:</b>	Commercial Premises	Commercial Premises
<b>Number of Bedrooms:</b>	N/A <sup>1</sup>	N/A <sup>1</sup>
<b>EA Vulnerability Classification:</b>	Less Vulnerable	Highly Vulnerable
<b>Ground Floor Level:</b>	Elevations on site vary between approximately 5.59mAOD and 6.07mAOD (2m LiDAR data).	
<b>Level of Sleeping Accommodation:</b>	N/A <sup>1</sup>	N/A <sup>1</sup>
<b>Impermeable Surface Area:</b>	480m <sup>2</sup>	480m <sup>2</sup>
<b>Surface Water Drainage:</b>	N/A <sup>1</sup>	N/A <sup>1</sup>
<b>Site Size:</b>	218m <sup>2</sup>	218m <sup>2</sup>
Risk to Development	Summary	Comment
<b>NRW Flood Zone:</b>	C1	
<b>Flood Source:</b>	Tidal	Irish Sea
<b>1:200 Year Flood Depth</b>	5.78mAOD	Flood levels supplied by NRW. Node RC06 is deemed to be the most appropriate for the site.
<b>1:200 Year Flood Depth + Climate Change</b>	6.38mAOD	
<b>1:1000 Year Flood Depth</b>	5.97mAOD	
<b>Recorded Flood Events in Area:</b>	Yes	
<b>Recorded Flood Events at Site:</b>	No	
<b>SFCA Available:</b>	Yes	Sir Ddinbych Denbighshire County Council SFCA, 2018
Management Measures	Summary	Comment
<b>Ground floor level above extreme flood levels:</b>		
<b>Safe Access/Egress Route:</b>	Yes	Refer to Section 7
<b>Flood Resilient Design:</b>	Yes	Refer to Section 7
<b>Site Drainage Plan:</b>	N/A <sup>1</sup>	
<b>Flood Warning &amp; Evacuation Plan:</b>	Yes	Refer to Section 7
Offsite Impacts	Summary	Comment
<b>Displacement of floodwater:</b>	Negligible	Refer to Section 8
<b>Increase in surface run-off generation:</b>	Negligible	Refer to Section 8
<b>Impact on hydraulic performance of channels:</b>	No	No channels impacted by the proposed development

Table 1: Summary of flood risks, impacts and proposed flood mitigation measures.

N/A<sup>1</sup> not required for this assessment; N/A<sup>2</sup> data not available.

## 2. Development Description and Site Area

### Proposed Development and Location

- 2.1 The proposed development is located at 34 Wellington Road, Rhyl, LL18 1BN (Figure 1 and Figure 2).
- 2.2 The site is currently a commercial premises. It is understood that the development is for the conversion of a vacant public house to a community centre. The FCA is support a 'change of use' application for the conversion.
- 2.3 Elevations on site vary between approximately 5.59mAOD and 6.07mAOD (2m LiDAR data). Analysis of topographic levels indicates that the site generally slopes to the south-east.

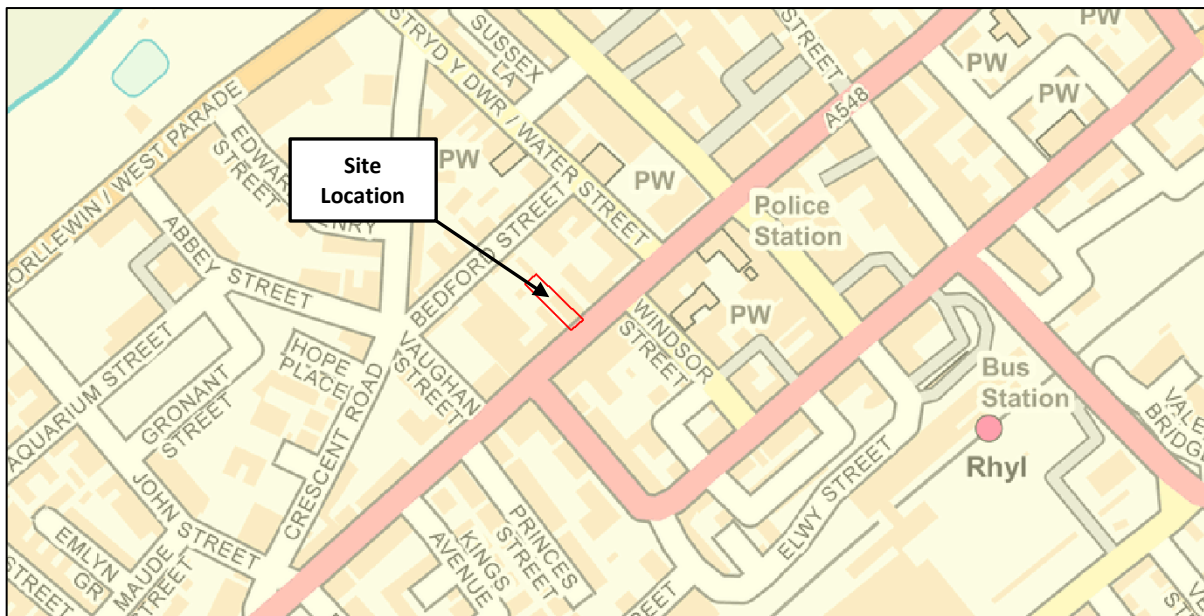


Figure 1: Location Map, identifying the location of the proposed development (Source: OS)



Figure 2: Aerial Map, identifying the location of the proposed development (Source: Google)

## Vulnerability Classification

- 2.4 The NRW Development Advice Map (Figure 3) demonstrates that the proposed development lies within Fluvial Flood Zone C1 (areas of the floodplain served by significant defence infrastructure). According to the NRW detailed online maps (Figure 4), the site also falls within Flood Zone 2 (with a greater than 0.1% chance of annual fluvial flooding) and Flood Zone 3 (with a greater than 1% chance of annual fluvial flooding).
- 2.5 According to the TAN15 development category guidelines, the existing public house retail development is classified as “Less Vulnerable”. Post-development, the community centre (public building) proposal is classed as “Highly Vulnerable” development category.

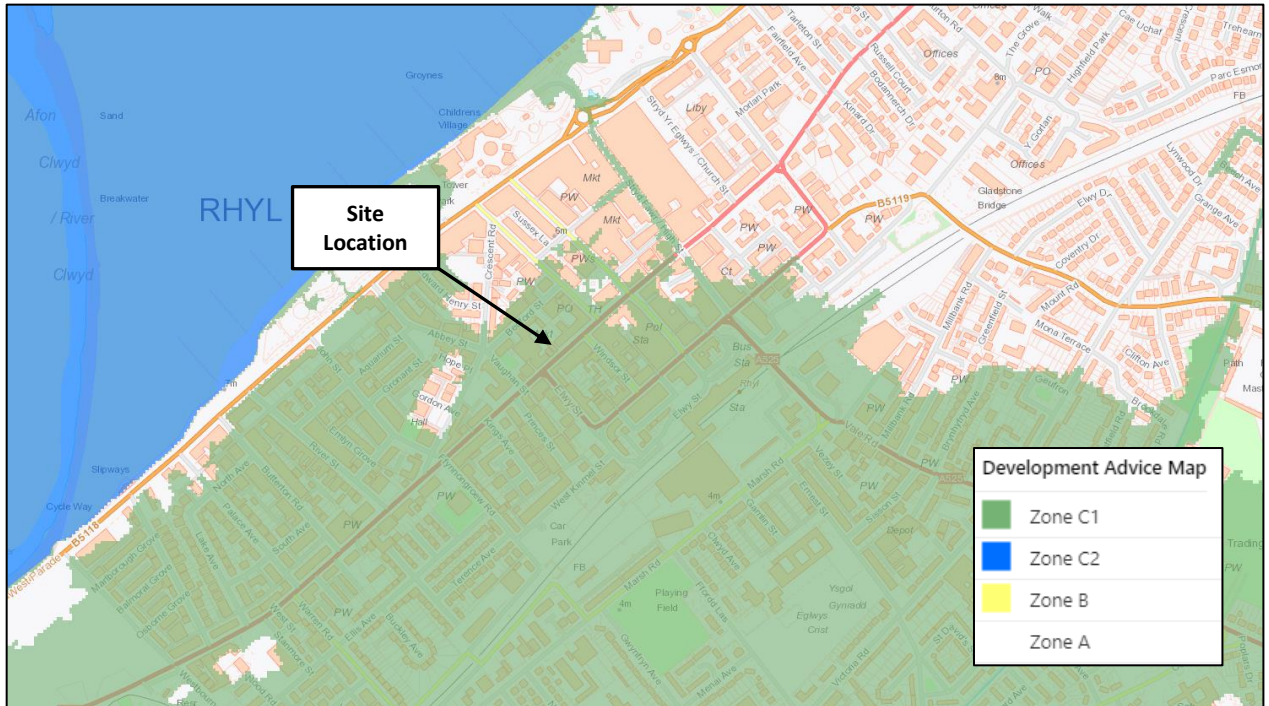


Figure 3: NRW Development Advice Map (Source: NRW)

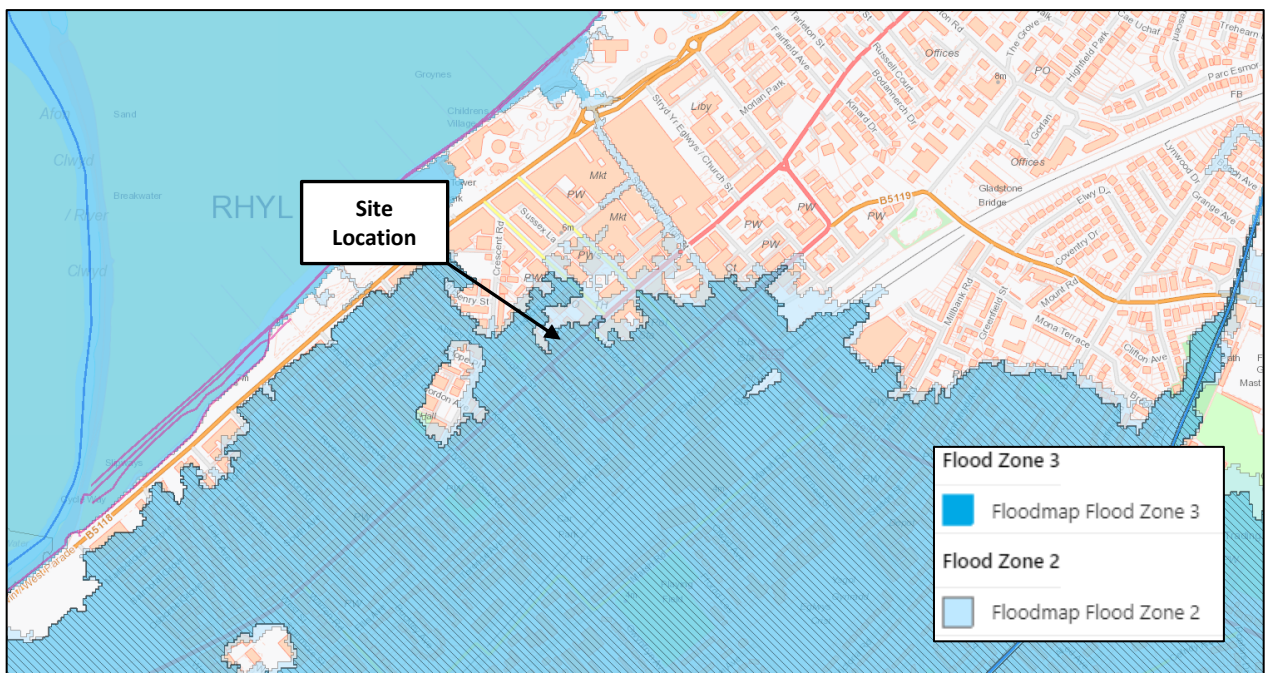


Figure 4: NRW Flood Zones (Source: NRW)



## Geology

- 2.6 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the bedrock underlying the site is Kinnerton Sandstone Formation comprising sandstone.
- 2.7 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the superficial deposits underlying the site are Blown Sand comprising sand.

### 3. Justifying the Location of Development

3.1 In order to justify development within Zone C Section 6 of TAN15 requires that:

- i. *Its location in zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; or,*
  - ii. *Its location in zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;*
- and,*
- iii. *It concurs with the aims of PPW and meets the definition of previously developed land (PPW fig 2.1); and,*
  - iv. *The potential consequences of a flooding event for the particular type of development have been considered, and in terms of the criteria contained in sections 5 and 7 and appendix 1 found to be acceptable.*

3.2 With respect to Criterion i. and ii. above, the proposed development is for a community centre. The placement of a community centre will address the objectives set out in the Denbighshire Adopted Local plan for (PSE8) states *'We also need to improve the environment around these homes to create a sense of neighborhood and community. To achieve this in a time of significant public sector financial constraints, we will need to promote community engagement in civic initiatives to improve local places and amenities.'*

3.3 The benefits of community centres include:

- providing the opportunity for people to be involved in a wide range of learning, social and physical activities
- promoting individual and community involvement and well being
- promoting social inclusion for people with difficulties which prevent them becoming involved
- providing opportunities for the community to meet and mix
- supporting the local management of services

3.4 With respect to Criterion iii. above, the proposed development is for the conversion of a public house to a community centre. This complies with Policy BSC 2 of the Denbighshire Local Plan.

3.5 Policy BSC 2 of the Denbighshire Adopted Local Plan states - Brownfield development priority - Development proposals in Lower Growth Towns, Llangollen, Rhuddlan and villages with development boundaries as defined in the inset maps will be directed towards previously developed land, except where greenfield land is allocated for development in the Plan. It is considered important to emphasise redevelopment of brownfield sites, where possible, in line with wider objectives for regeneration in the North Wales Coast Strategic Regeneration Area.

3.6 With respect to Criterion iv. above, this document aims to demonstrate that the development will be safe for its lifetime with no increase to flood risk elsewhere. It should be noted, that while the development is classified as 'highly vulnerable' it will not facilitate residential use. The existing public house would also be classified as 'highly vulnerable' and therefore the proposed development will not increase vulnerability at the site and will not increase the number of people located within a flood zone.

3.7 As such the following will be addressed as detailed in TAN15 Acceptability Criteria (Section 7 & Appendix 1) for highly vulnerable developments located within Flood Zone C1

## 4. Site Flood Hazards

### Sources of Flooding

4.1 The proposed development is located within Flood Zone C1 (high risk of flooding) and is considered to be “Highly Vulnerable” according to TAN15 guidelines. Table 2 summarises the potential sources of flooding to the site:

Source	Description
<b>Tidal</b>	Irish Sea River Clwyd Rhyl Cut
<b>Surface</b>	In area
<b>Groundwater</b>	In area
<b>Sewer</b>	No evidence of sewer flooding on site

Table 2: Summary of flood sources.

### Mechanisms and History of Flooding

4.2 The Development Advice Map (Figure 3) demonstrates the site to be located within Flood Zone C1 (high risk of flooding). According to the NRW detailed online maps (Figure 4), the site also falls within Flood Zone 2 (with a greater than 0.1% chance of annual fluvial flooding) and Flood Zone 3 (with a greater than 1% chance of annual fluvial flooding).

### Tidal

4.3 The development site can be seen shown to be partially located within Flood Zones 2 and 3 (Figure 5).

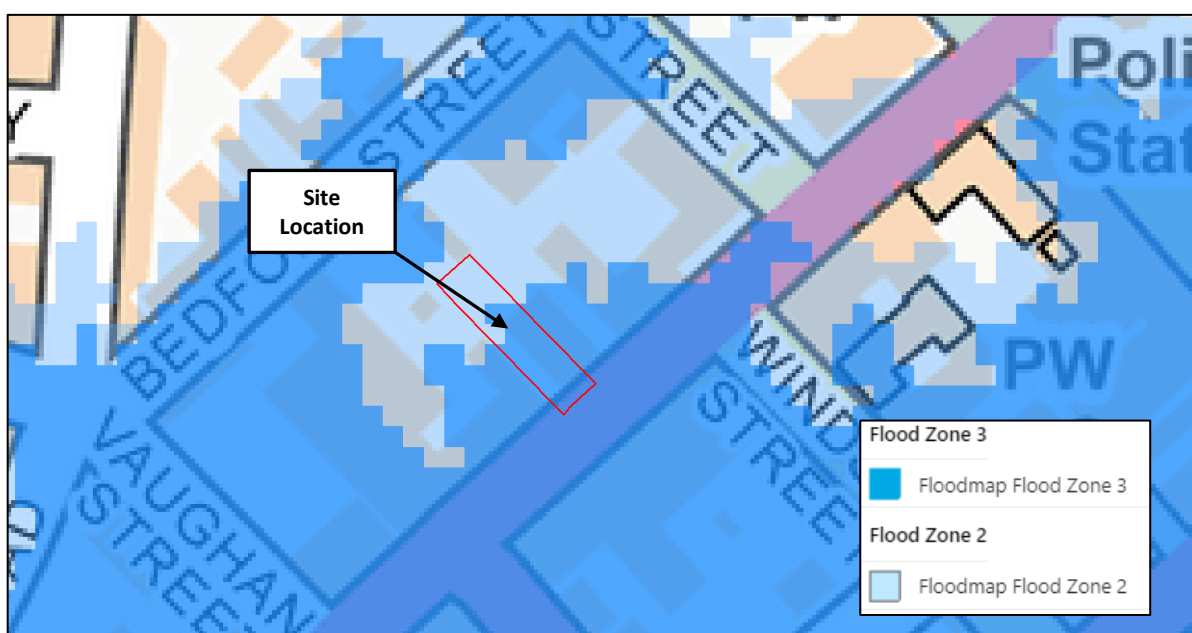


Figure 5: Flood Zones at the Site (Source: NRW)

- 4.4 NRW tidal flood level data was provided to Ambiental. It was deemed that Node RC06 was the most representative of flood levels at the site. This is due to the elevation of West Parade (Rhodfa Gorllewin) being greater than the 1000 year flood level of 5.96m AOD on the seaward side of the road (Node RC08), as can be seen in Figure 7.

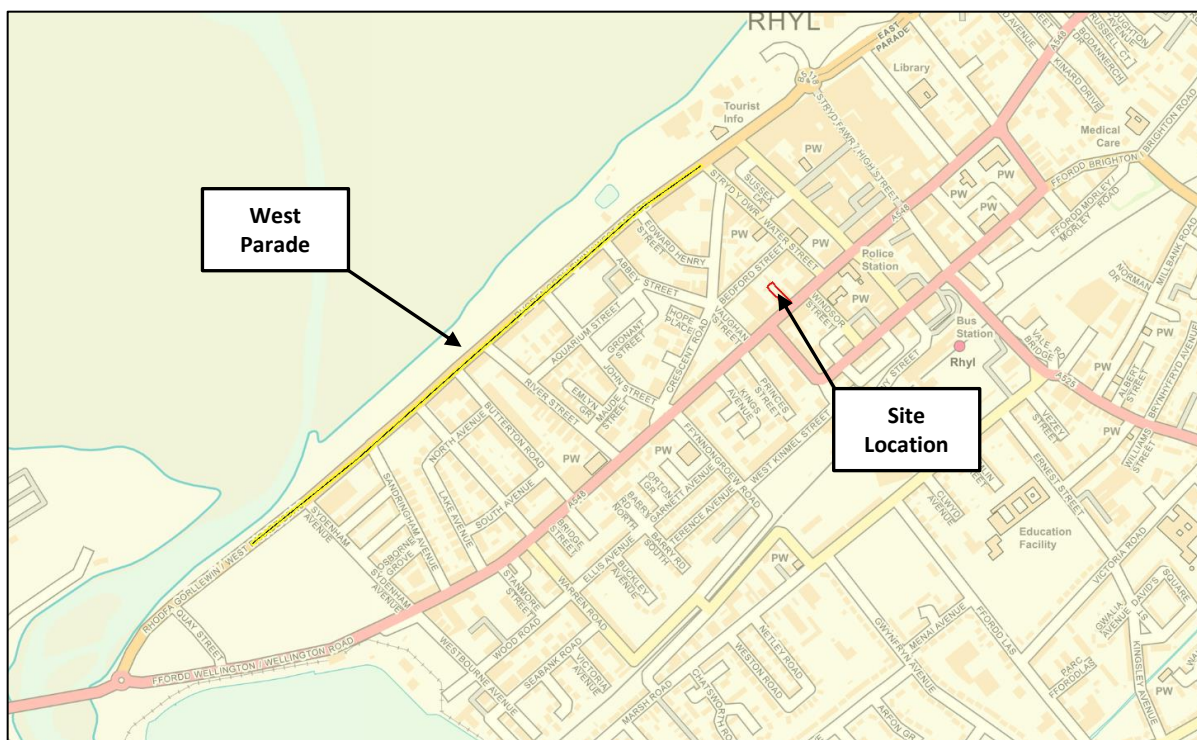


Figure 6: West Parade and Proposed Site Location

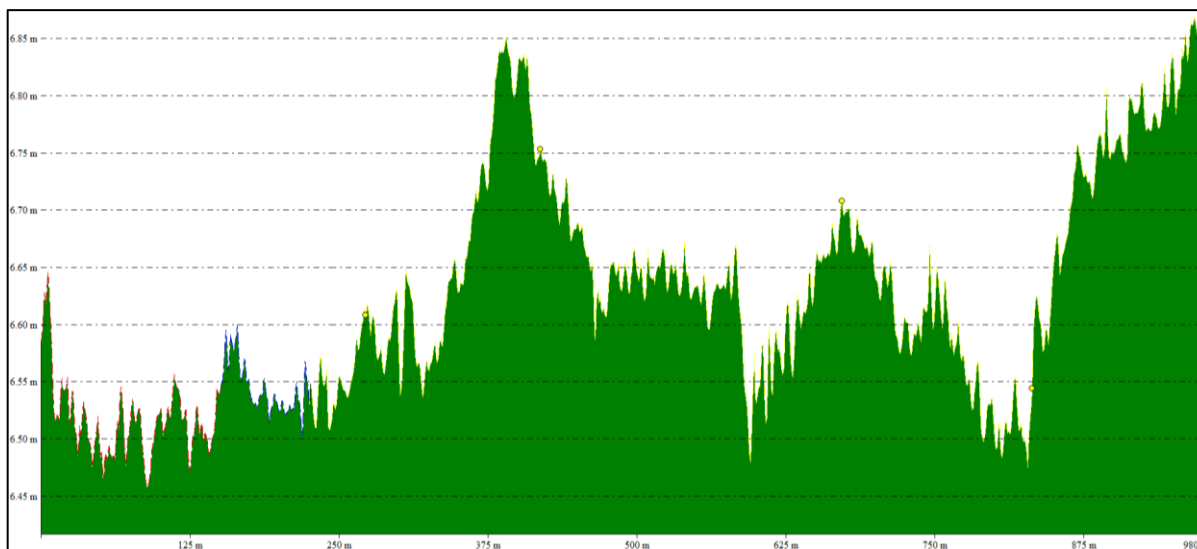


Figure 7: West Parade Elevation (Source: EA LiDAR)

- 4.5 Accordingly, the 200 year tidal flood level for the site is 5.78m AOD. This would result in a maximum potential flood depth of 0.19m. As stated earlier, the site slopes towards the south-east (the road) and as such, the finished floor level of the building is likely to be above this level.
- 4.6 Similarly, for the 200 year plus climate change flood event (2111 epoch), the tidal flood level is 6.38m AOD. A maximum potential flood depth of 0.79m could be anticipated for this event. This maximum level would occur towards the road where the site elevation is lowest.

- 4.7 However, it should be noted that these flood levels provided are simply extreme still water levels. As demonstrated within Figure 7, the topographic levels across the frontage of Rhyl are higher than this still water level. Furthermore, the site is located within Flood Zone C1, which is defined as an area served by significant defence infrastructure. **Therefore, it is highly unlikely that the proposed development will be affected by these still water flood levels. The main risk of flooding to the site would be in the event of breach/failure of defences.**
- 4.8 The North West England and North Wales Shoreline Management Plan (2012) shows that the defences benefitting the site are classed as 'hold the line' and are expected to be maintained in the foreseeable future (Figure 17).
- 4.9 As such, the risk of flooding from this source is deemed to be **relatively low**.

## Surface Water (Pluvial)

- 4.10 The NRW Surface Water Flood Risk Map (Figure 8) shows the proposed development to be adjacent to an area of 'Low' risk of flooding from surface water. Areas identified to be at 'Low' risk have a 0.1% to 1% annual risk of flooding from this source.
- 4.11 The NRW Surface Water Flood Risk Map for the High Risk Scenario indicates that the proposed development is not affected in this event. Areas identified to be at 'High' risk have a greater than 3.3% annual risk of flooding from this source.
- 4.12 The NRW Surface Water Flood Risk Map for the Medium Risk Scenario indicates that the proposed development is not affected in this event. Areas identified to be at 'Medium' risk have a 1% to 3.3% annual risk of flooding from this source.
- 4.13 The NRW Surface Water Flood Risk Map for the Low Risk Scenario (Figure 9) indicates that the proposed development is adjacent to an area which may experience flood levels of less than 300mm in this event. A Low Risk Scenario has a 0.1% to 1% annual risk of occurring.

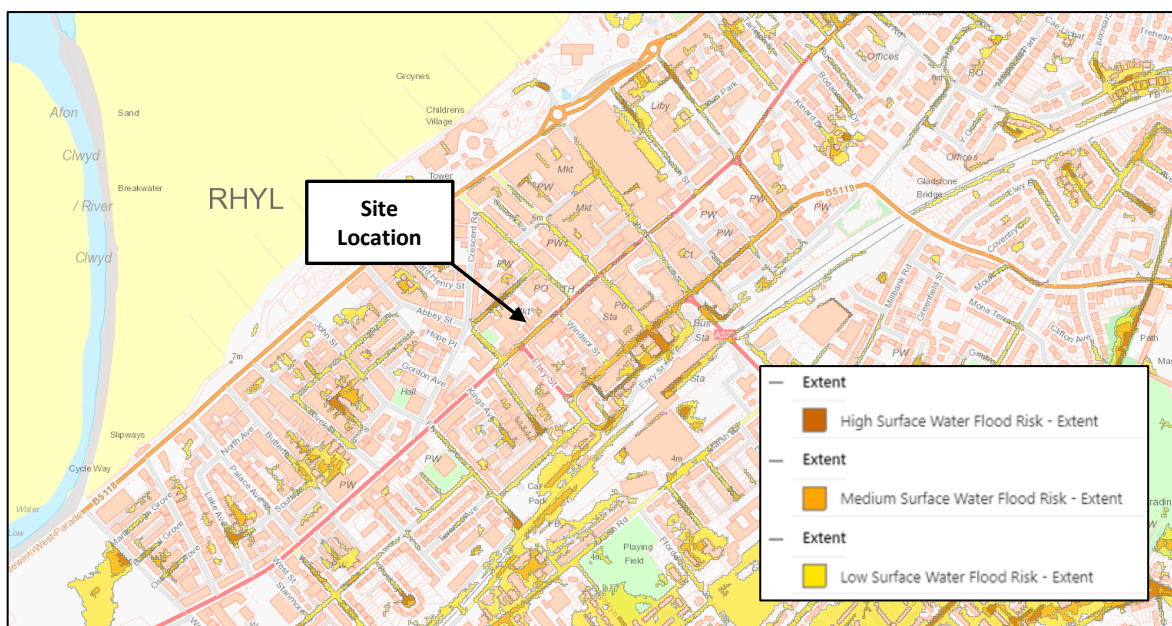


Figure 8: NRW Surface Water Flood Risk Map. (Source: NRW)

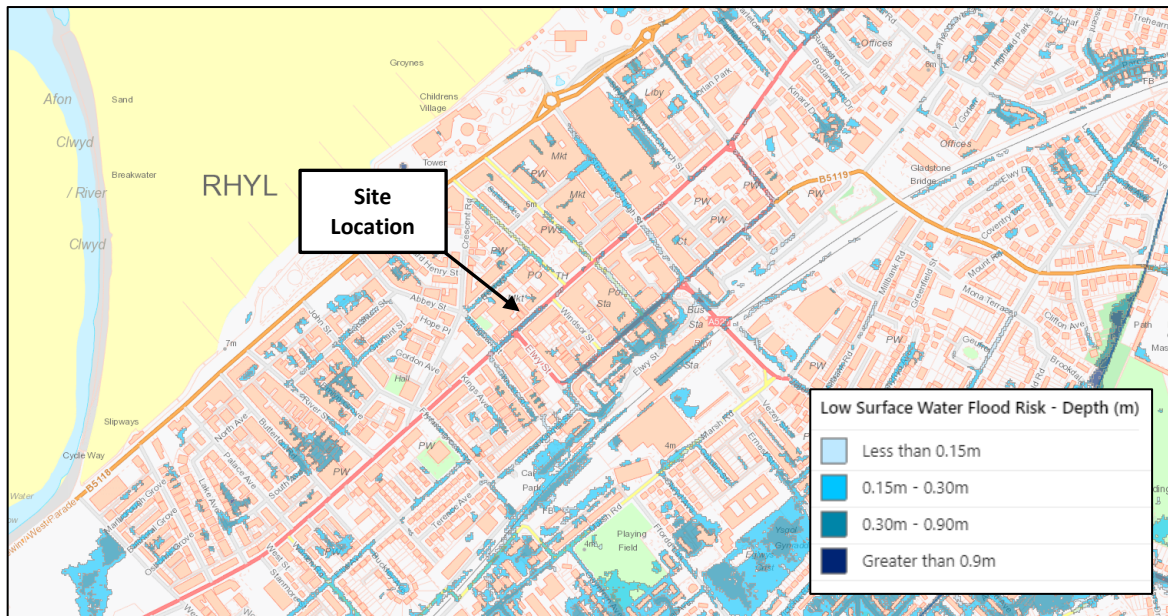


Figure 9: Surface Water Depths for a Low Risk Scenario. (Source: NRW)

4.14 As such, the risk of flooding from this source is deemed to be **relatively low**.

### Groundwater

4.15 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the bedrock underlying the site is Kinnerton Sandstone Formation (Source: BGS). This formation is considered to be a Principal aquifer (Figure 10).

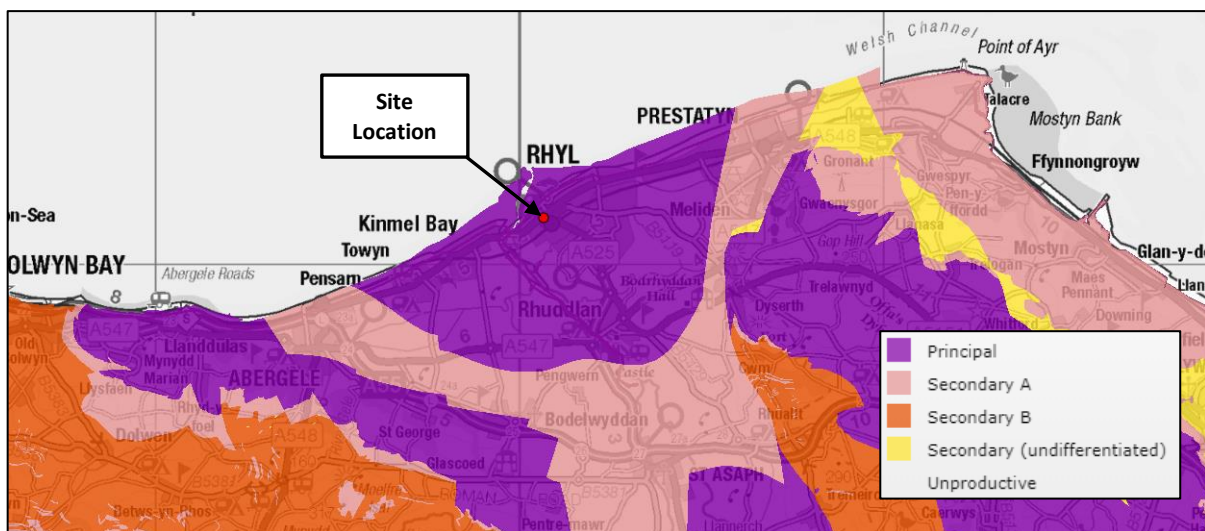


Figure 10: Bedrock Aquifer Designation Map (Source: DEFRA Magic Map)

4.16 The British Geological Survey Geology of Britain Viewer indicates that the superficial deposits underlying the site are Blown Sand comprising sand. This formation is not considered to be an aquifer.

4.17 The Sir Ddinbych Denbighshire County Council SFC (2018) Areas Susceptible to Groundwater Flooding Map (Figure 11) shows the site to lie in an area classed as being between 50% and 75%. This signifies that between 50% and 75% of the area (tile) is potentially at risk of groundwater flooding.

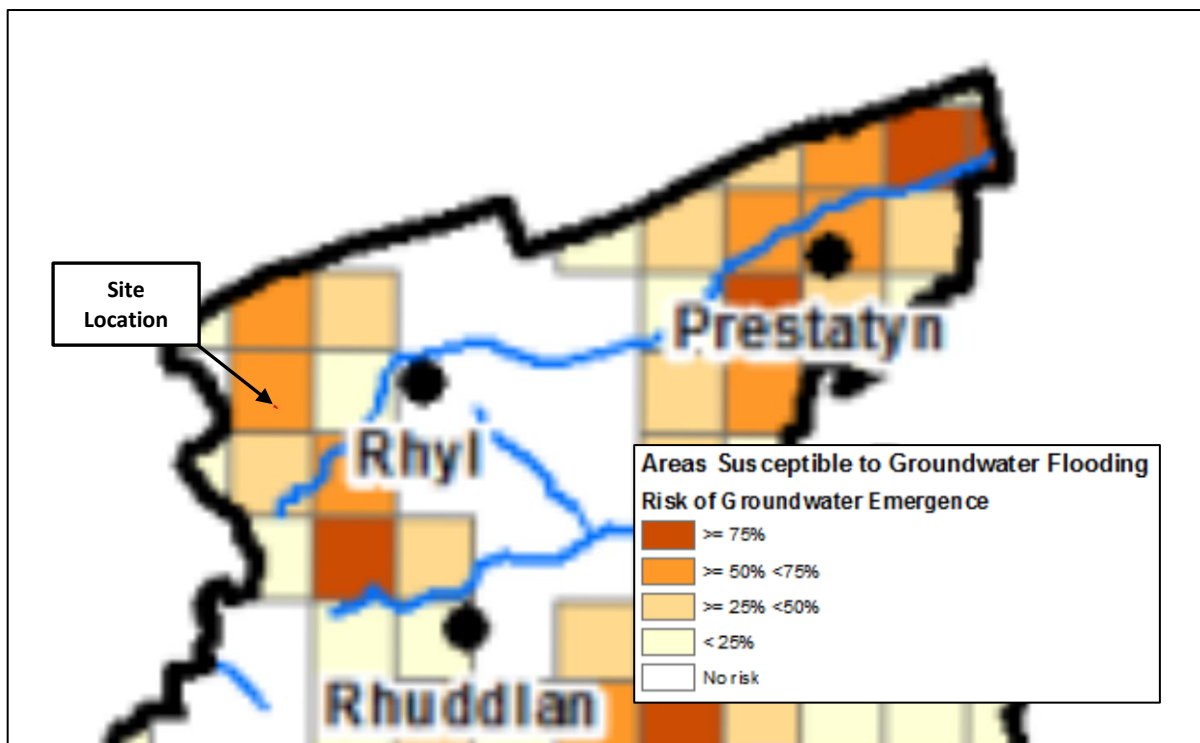


Figure 11: Areas Susceptible to Groundwater Flooding (Source: Sir Ddinbych Denbighshire County Council SFCA, 2018)

4.18 As such, the risk of flooding from this source was deemed to be **relatively low to moderate**.

### Sewer

4.19 The Sir Ddinbych Denbighshire County Council SFCA (2018) Historic Sewer Flooding Map (Figure 12) shows the site to be located away from most sewer flooding incidents.

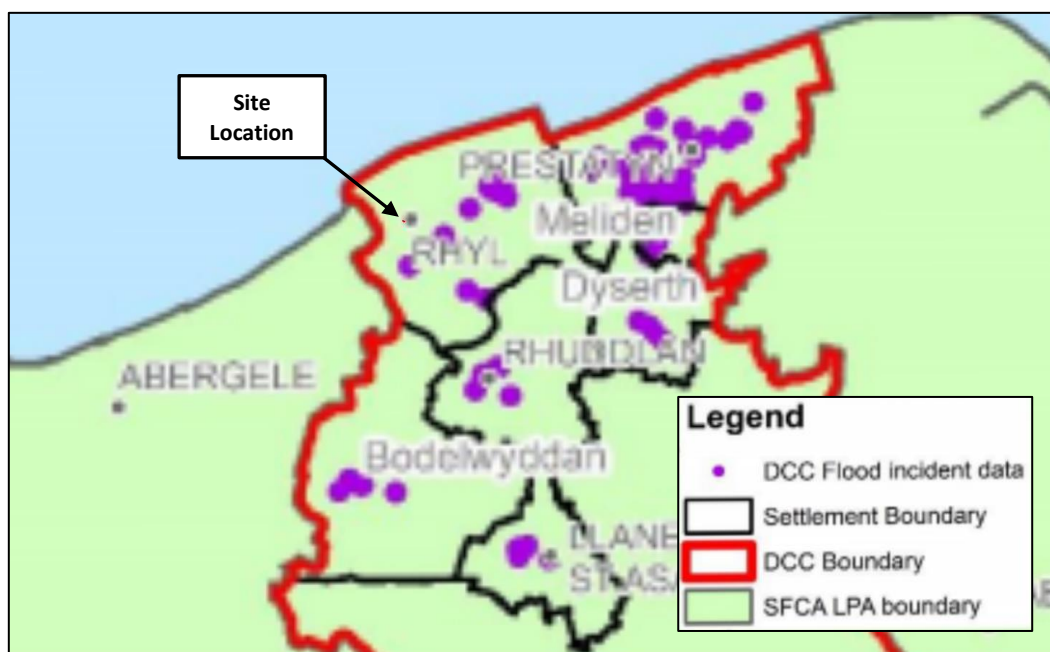


Figure 12: Historic Sewer Flooding Incidents Map (Source: Sir Ddinbych Denbighshire County Council SFCA, 2018)

4.20 As such, the risk of flooding to the site from this source is deemed to be **relatively low**.

## Surface Water Drainage Strategy

- 4.21 It is understood that the development is for the conversion of a vacant public house to a community centre.
- 4.22 There will be negligible change in the built footprint as a result of the proposed development, as the application is for a 'change of use'.
- 4.23 It is recommended that the site developer discharge runoff generated by the existing building maintains the existing drainage regime and drains via the existing drainage network.

## Records of Historical Flooding

- 4.24 NRW hold historic flooding data for the district which shows the site to be outside all historic recorded flood extents.
- 4.25 The Sir Ddinbych Denbighshire County Council SFCA (2018) indicates that there have been several recorded flooding incidents within the borough (Table 3). These records do not indicate any historic flooding having occurred at the proposed development site.

Year of Flood	Area Effected	Type of Flood	Consequence
2013	East Rhyl	Coastal	120 residential properties flooded
2012	St Asaph, Rhuddlan, Ruthin,	Main River	550 residential properties flooded at various locations across the county
2007	Prestatyn	Surface water	13 residential properties flooded by surface water at various locations in Prestatyn
2000	Dyserth	Ordinary Watercourse	5 residential properties flooded from Afon Ffyddion
2000	St Asaph	Ordinary Watercourse	7 residential properties flooded from Glascoed Stream
2000	Llanbedr	Ordinary Watercourse	7 residential properties flooded from un-named watercourse.
2000	Corwen	Ordinary Watercourse	23 residential properties flooded from Afon Nant y Cawrddu
2000	Ruthin	Main River	20 residential properties, 6 business properties.
1990	Rhyl & Prestatyn	Coastal	108 residential properties

Table 3: Significant Flood Events in Denbighshire (Source: Sir Ddinbych Denbighshire County Council SFCA, 2018)



## 5. Probability of Flooding

### Flood Zones

- 5.1 According to the NRW Development Advice Map, the site is located within Flood Zone C1, which encompasses areas of the floodplain which are developed and served by significant infrastructure, including flood defences.
- 5.2 The NRW Development Advice Map has been produced in part using a relatively coarse, national scale flood modelling strategy, and in part by detailed modelling. It is important to note that only the potential floodplain is modelled; the mitigating effects of any flood defences currently in place are not considered. For reference, the definition of TAN15 flood risk zones is included in Table 4.

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

Table 4: Definition of TAN15 Flood Zones. (Source: EA)

### Climate Change on Site

- 5.3 UK Climate Impacts Programme scenarios forecast that by 2080 Wales will be 1.1°C to 2.9°C warmer than at present (TAN15). Increased temperature will likely increase storm frequency, rainfall and raise sea-levels.
- 5.4 The NRW provided data outlined the sea level rise allowances used for the site. The corresponding sea level allowances are shown in Table 5 below.

Assumed Vertical Land Movement	1990-2025	2025-2055	2055-2085	2085-2115
-0.5	3.5	8.0	11.5	14.5

Table 5: Sea Level Rise (mm per year) (Source NRW)

## 6. Residual Risks

### Identification of Residual Risks

- 6.1 Residual risks are those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include:
- the failure of flood management infrastructure such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system, or;
  - a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.

### Defence Breach

- 6.2 The site is located within Flood Zone C1. Accordingly, the site is served by significant defence infrastructure.
- 6.3 The Sir Ddinbych Denbighshire County Council SFCA (2018) Defence Breach Mapping (Figure 13) shows the site to lie within the 200 year plus climate change and 1000 year plus climate change tidal flood extents.
- 6.4 As part of the Sir Ddinbych Denbighshire County Council SFCA 4 breach scenarios have been modelled;
- Prestatyn Breach;
  - Rhuddlan Marine Lake Breach;
  - Rhuddlan Clwyd Breach;
  - Bodelwyddan.
- 6.5 Breach locations have been selected based on a review of existing defences and to provide DCC with indicative extents of flooding at these locations.
- 6.6 Ambiental have reviewed the flood extents for each scenario and the Rhuddlan Clwyd/Rhuddlan Marine Lake Breach are the scenarios shown to affect the site (Figure 13). The flood depths, extents, velocity and hazard ratings are the same at the site for each scenario. Figure 13-16 show the Rhuddlan Clwyd Breach scenario.
- 6.7 Analysis of the flood depths (Figure 14) during the 200+CC breach scenario is difficult given the symbology used. However, it is estimated that flood depths would be on the lower end of the scale. An estimate of flood depths would be circa. 1m during the 200+CC breach event.
- 6.8 Similarly, when analysing velocity during a 200+CC breach (Figure 15) it is difficult to determine the exact risk. However, the site is generally on the lower end of the scale. Wellington Road is towards the middle of the scale at circa. 2.8m/s, these areas are primarily confined to the lower road areas.
- 6.9 The hazard rating during a 200+CC breach event (Figure 16) is considered to be 'significant'. A small area, primarily confined to the road area along Wellington Road has been deemed to have a 'Extreme' hazard rating. This is likely associated with the increased velocity, identified in Figure 15, along road infrastructure.

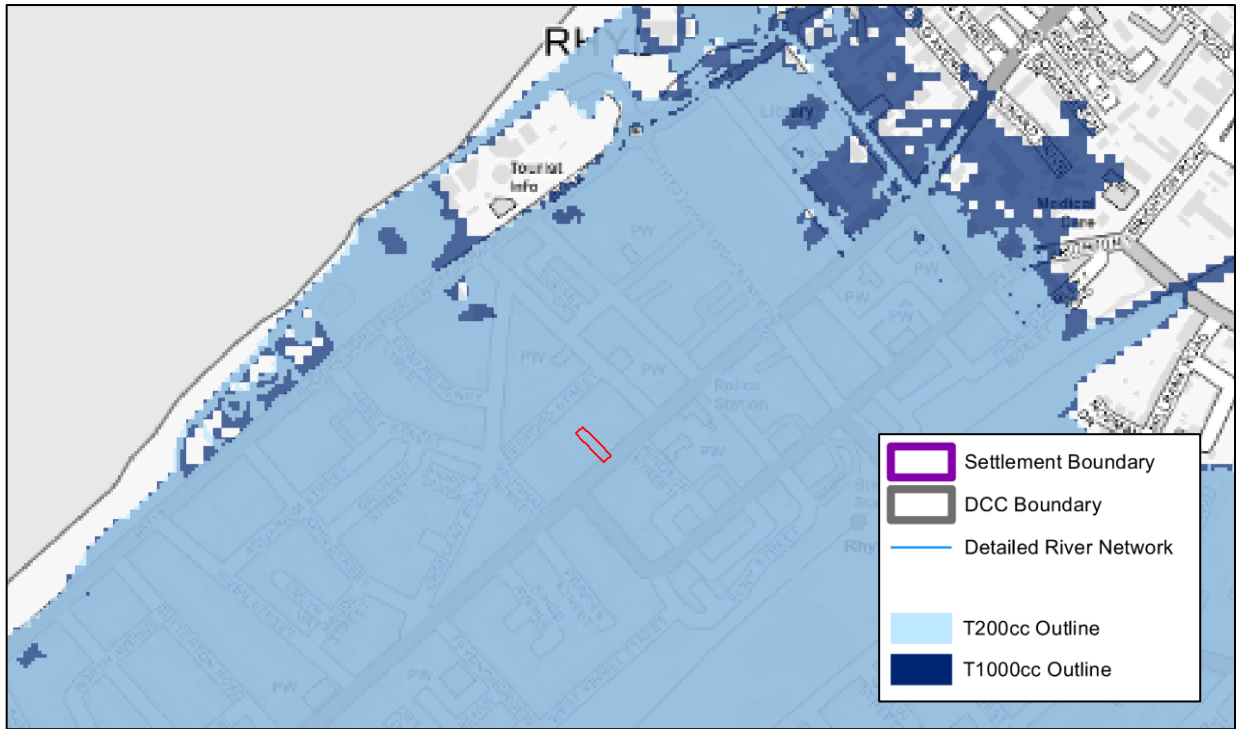


Figure 13: Defence Breach Mapping (Source: Sir Ddinbych Denbighshire County Council SFCA, 2018)

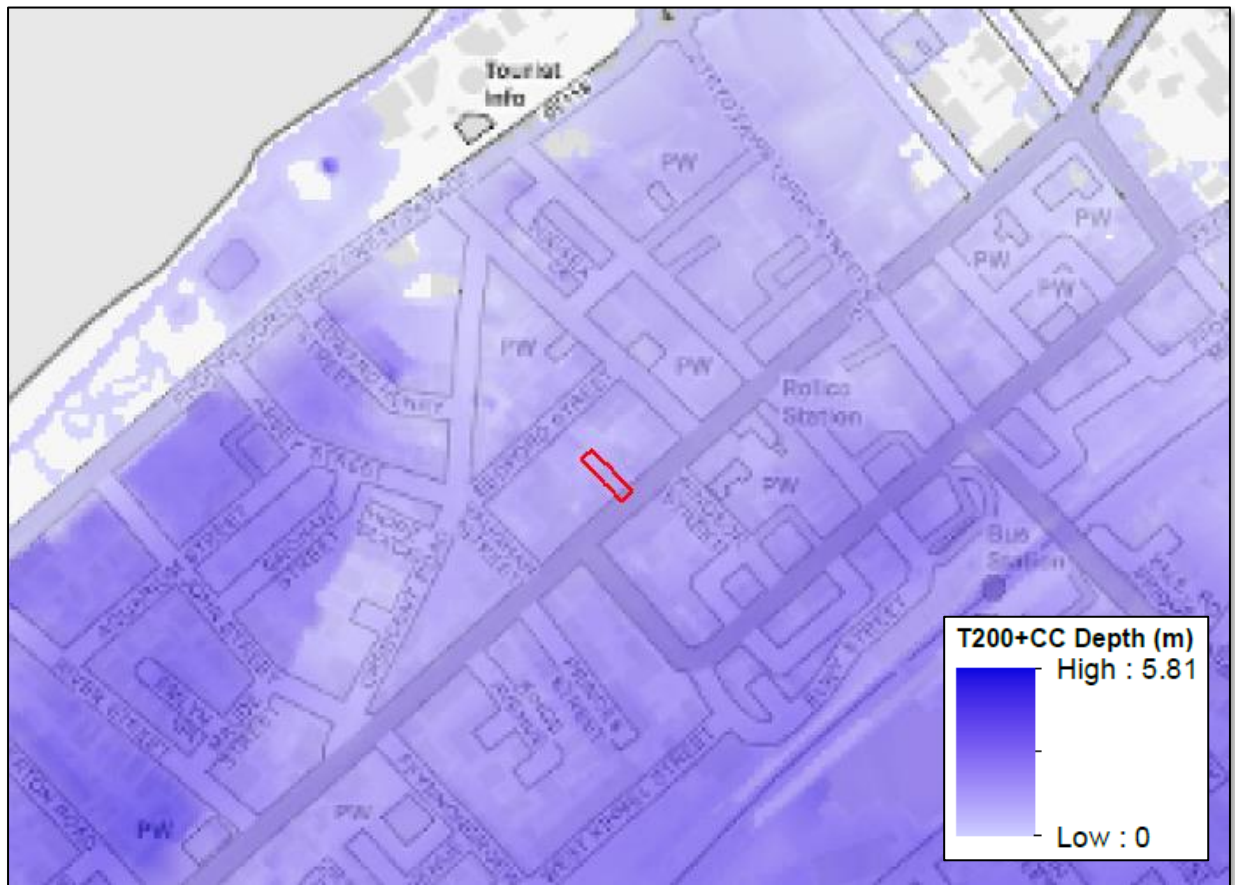


Figure 14: Rhuddlan Clwyd Breach scenario – 200+CC Depth (Source: Denbighshire SFCA)

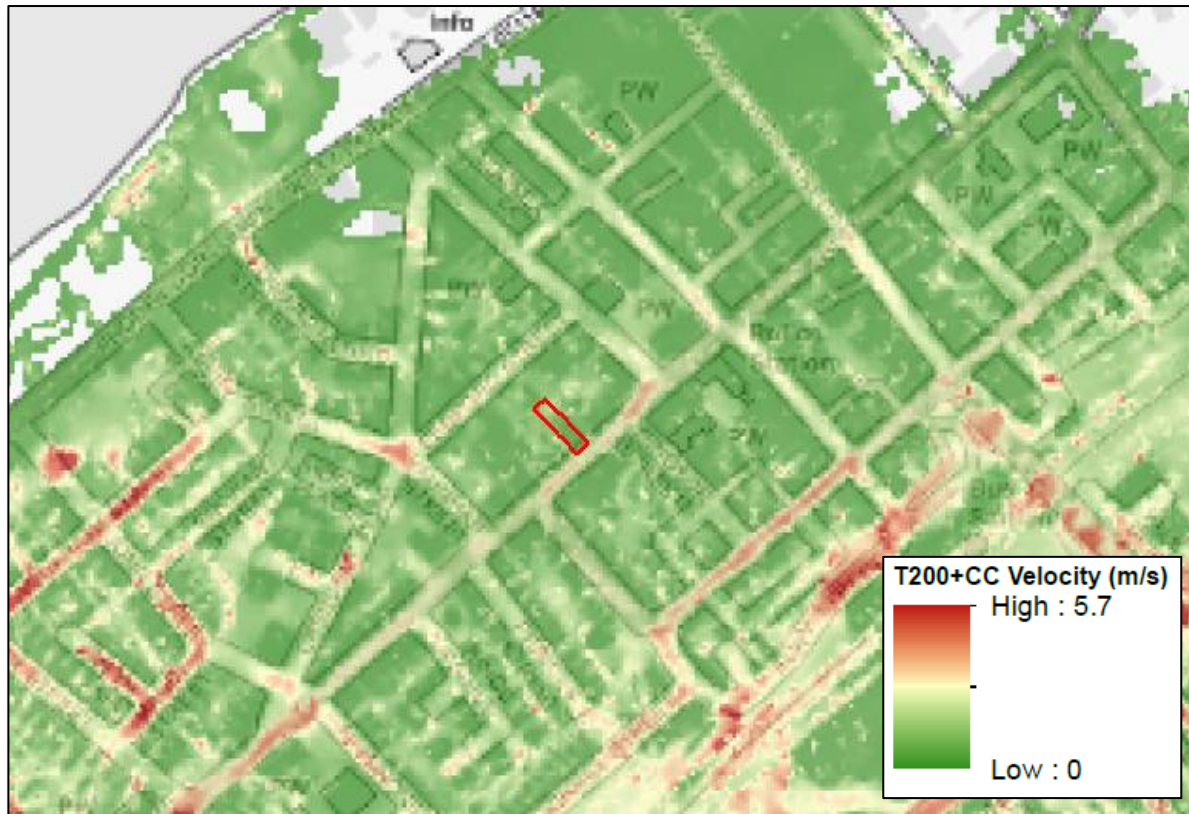


Figure 15: Rhuddlan Clwyd Breacch scenario – 200+CC Velocity (Source: Denbighshire SFCA)

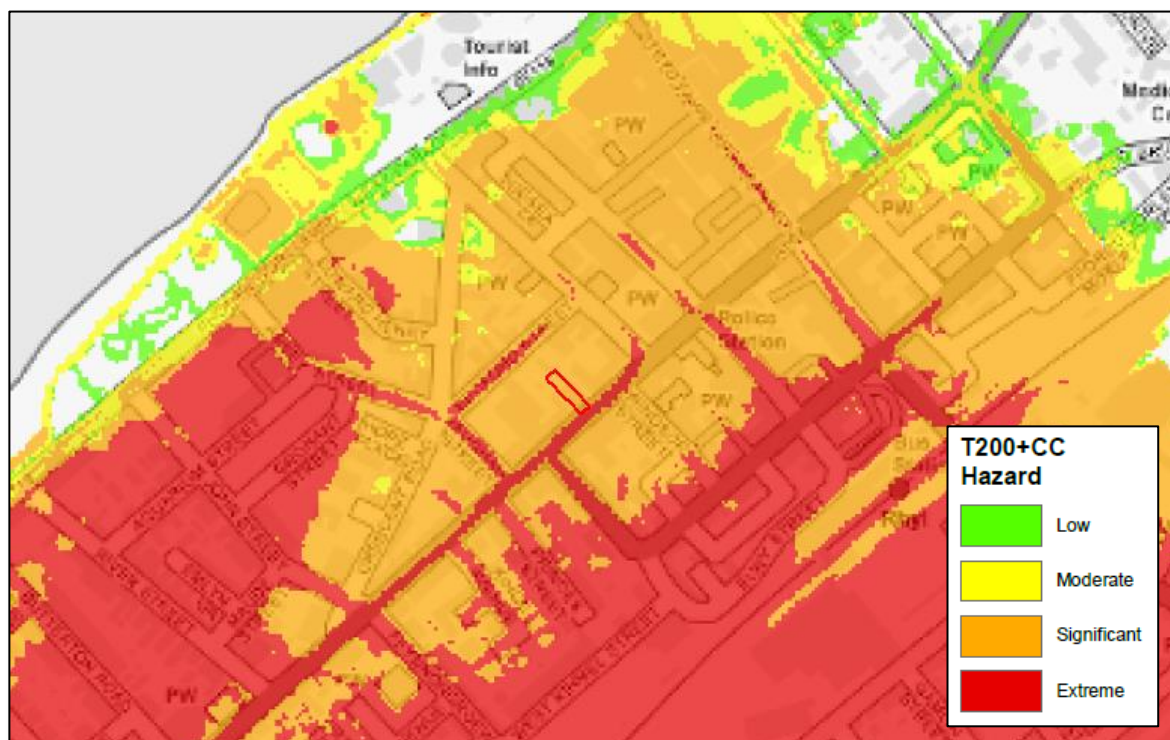


Figure 16: Rhuddlan Clwyd Breacch scenario – 200+CC Hazard (Source: Denbighshire SFCA)

6.10 The North West England and North Wales Shoreline Management Plan (2012) shows that the defences benefitting the site are classed as ‘hold the line’ and are expected to be maintained in the foreseeable future (Figure 17).

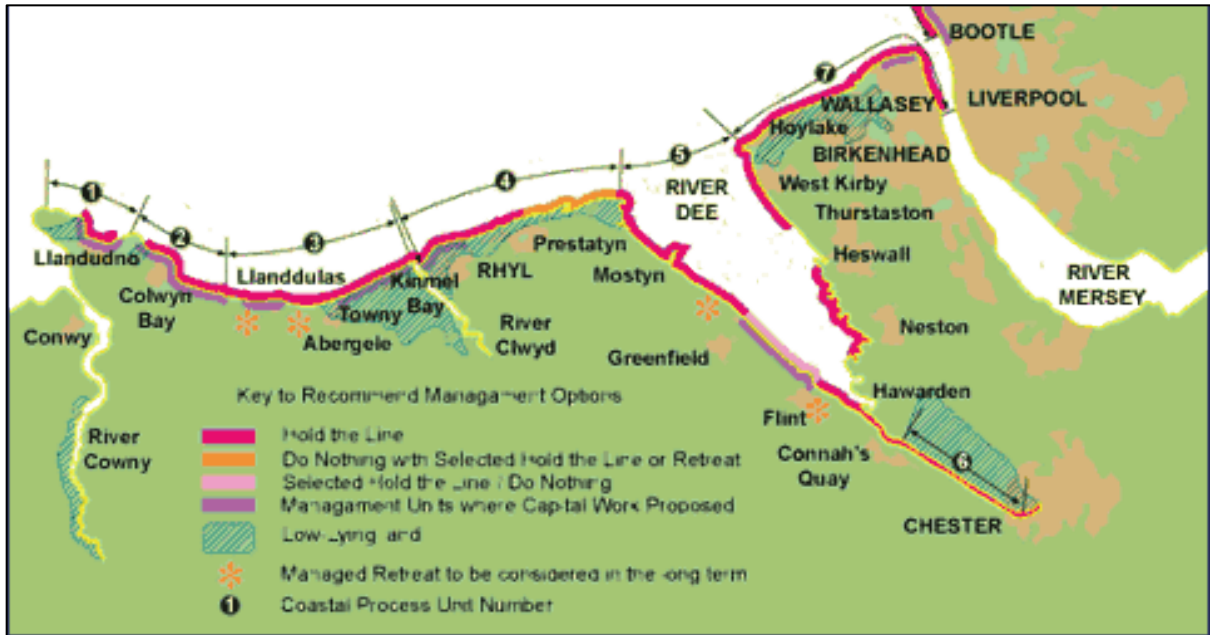


Figure 17: Defence Details (Source: North West England and North Wales Shoreline Management Plan 2, 2012)

6.11 As such, the residual risk of defence breach is deemed to be **relatively low**.

### Reservoir Failure

6.12 The site is shown to lie outside of the NRW Reservoir Flood Risk flooding extents (Figure 18).

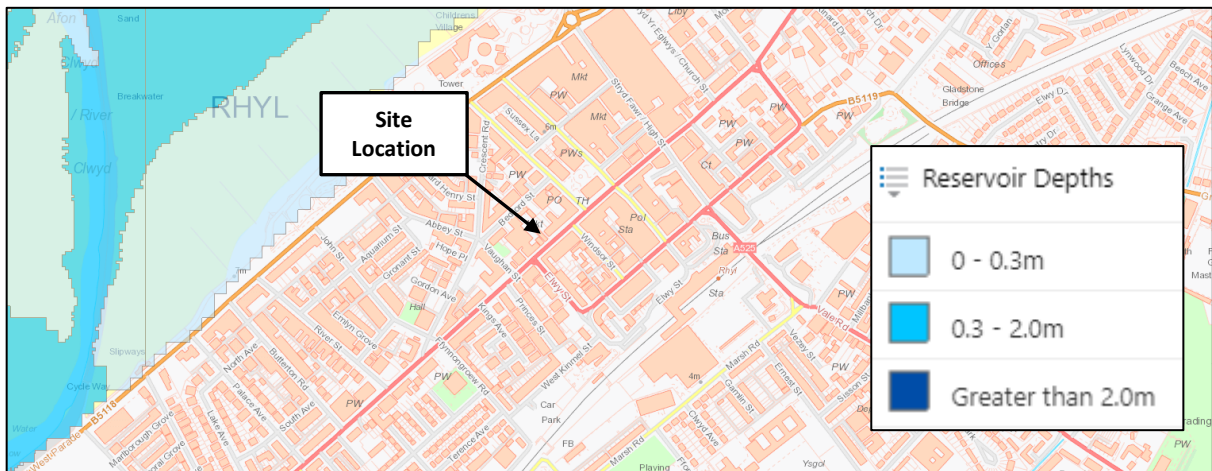


Figure 18: Reservoir Flood Risk Map (Source: NRW)

6.13 As such, the residual risk of reservoir failure is deemed to be **low**.

### Drainage Exceedance

6.14 In the event of drainage system failure under extreme rainfall events or blockage, flooding may occur within the site. In the event of the development’s drainage system failure, the runoff flow will be dictated by topography on site. Topographic elevations on site suggest that runoff would be directed towards the south-east of site.

6.15 There is also no history of drainage exceedance in the area and the site is predominantly at risk of fluvial flooding (for which drainage exceedance would have little consequence).

6.16 As such, the residual risk of drainage exceedance is deemed to be **low**.

## 7. Flood Risk Management Measures

### Flood Risks

7.1 It is understood that the development is for the conversion of a vacant public house to a community centre.

7.2 The existing site is located within Flood Zone C1. The existing use is considered “Less Vulnerable” and will be classed as “Highly Vulnerable” under post development conditions.

7.3 The site has been identified to be at a relatively low risk of flooding from all sources, with the exception of groundwater flooding which is considered low to moderate. Accordingly, it is recommended that the developer implements the following measures:

- all plumbing insulation to be of closed-cell design;
- non-return valves to be fitted to drain and sewer outlets;
- anti-syphon fitted to all toilets;
- retrofitting of flood resilience measures is to be implemented in line with the DEFRA Improving the Flood Performance of New Buildings (2007) report, (where possible).the proposed development is located within an NRW Flood Alert Service Area. Site users will be required to sign up to this service;
- an appropriate flood evacuation route has been proposed within this report.

7.4 The proposed development is within an NRW Flood Warning Area (Figure 19).

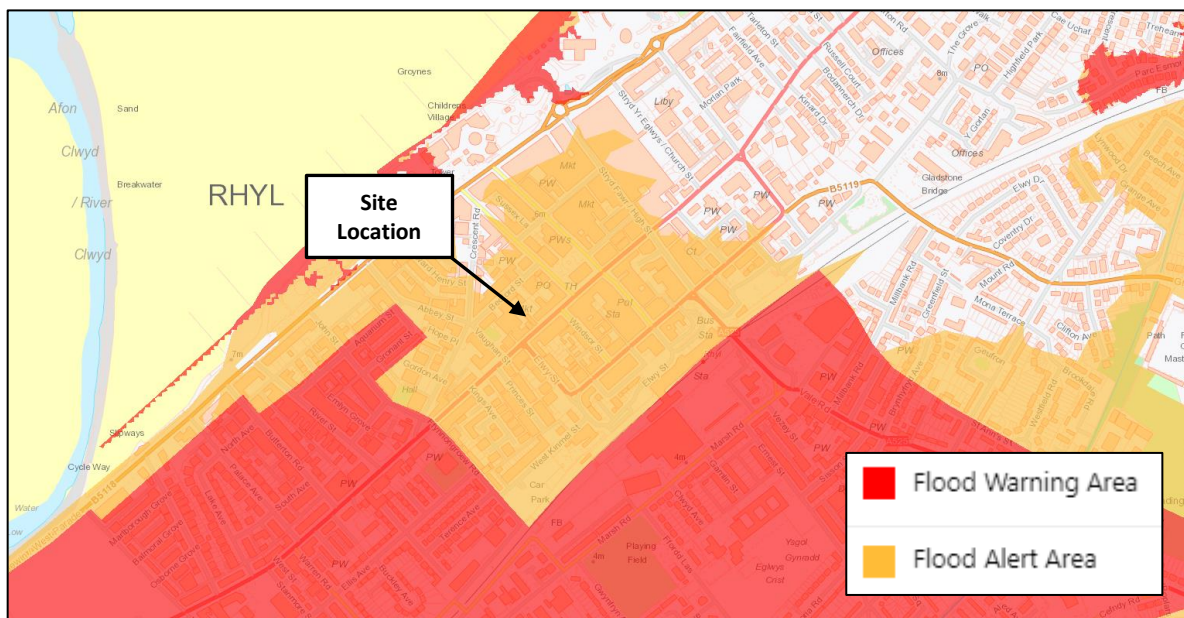


Figure 19: NRW Flood Warning/Alert Areas (Source: NRW)

### Flood Warning Service

7.5 The NRW operates a 24-hour telephone service on 0345 988 1188 that provides frequently updated flood warnings and associated floodplain information. Further information can be found on <http://naturalresourceswales.gov.uk/flooding/sign-up-to-receive-flood-warnings>. Floodline Warnings Direct

is a free service operated by the NRW that provides flood warnings direct to occupants by telephone, mobile phone, fax or pager.

- 7.6 The proposed development site is located within an NRW Flood Warning Service Area. As such, it is recommended that site users sign up to this service.

#### What to do if you receive a Flood Alert

A flood alert means you need to prepare: flooding is possible. You should:

- check your flood risk - <https://flood-warning-information.service.gov.uk/long-term-flood-risk>
- sign up for flood warnings - <https://www.gov.uk/sign-up-for-flood-warnings>
- keep up to date with the latest situation - call Floodline on 0345 988 1188 or follow @EnvAgency and #floodaware on Twitter for the latest flood updates
- have a bag ready with vital items like insurance documents and medications in case you need to leave your home
- check you know how to turn off your gas, electricity and water mains supplies
- plan how you'll move family and pets to safety



#### What to do if you receive a Flood Warning

A flood warning means you need to act: flooding is expected. You should do all the actions for a flood alert but also:

- move vehicles to higher ground if it's safe to do so
- move family and pets to safety
- move important items upstairs or to a safe place in your property, starting with cherished items and valuables, then furniture and furnishings
- turn off gas, electricity and water supplies if it's safe to do so; never touch an electrical switch if you're standing in water
- if you have property protection products such as flood barriers, or air brick covers, use them now
- keep track of the latest situation - <https://flood-warning-information.service.gov.uk/warnings>



#### What to do if you receive a Severe Flood Warning


A severe flood warning means there is danger to life: you must act now:




- call 999 if you're in immediate danger
- follow advice from the emergency services and evacuate if you're told to do so
- make sure you have an emergency kit including a torch, spare batteries, mobile phone and charger, warm clothes, important numbers like your home insurance, water, food, first aid kit and any medicines and baby care items you may need
- alert neighbours and offer help if it's safe to do so



- avoid driving or walking through flood water: just 30cm (1 foot) of fast flowing water could move your car and even shallow moving water can knock you off your feet
- keep your family and pets away from floodwater – it may contain heavy debris, sharp objects, open manhole covers, sewage and chemicals
- wash your hands if you've been in contact with flood water which may contain toxic substances

## Flood warnings - know what to do?



 <p><b>FLOOD ALERT</b></p>	<p><b>PREPARE</b></p>	<ul style="list-style-type: none"> <li>• Prepare a bag that includes medicines and insurance documents</li> <li>• Visit <a href="https://www.flood-warning-information.service.gov.uk">flood-warning-information.service.gov.uk</a></li> </ul>
 <p><b>FLOOD WARNING</b></p>	<p><b>ACT</b></p>	<ul style="list-style-type: none"> <li>• Turn off gas, water and electricity</li> <li>• Move things upstairs or to safety</li> <li>• Move family, pets and car to safety</li> </ul>
 <p><b>SEVERE FLOOD WARNING</b></p>	<p><b>SURVIVE</b></p>	<ul style="list-style-type: none"> <li>• Call 999 if in immediate danger</li> <li>• Follow advice from emergency services</li> <li>• Keep yourself and your family safe</li> </ul>

[flood-warning-information.service.gov.uk/what-to-do-in-a-flood](https://www.flood-warning-information.service.gov.uk/what-to-do-in-a-flood)

Floodline on 0345 988 1188

#floodaware



*Figure 20: Flood Guidance (Source: EA)*

As flood hazard is a combination of the depth and velocity of floodwater, evacuees should **not** enter floodwater unless:

- Emergency Services are present as part of an assisted / supervised evacuation
- or*
- Depths do not exceed 25cm

Obstacles below the water can present a significant hazard that may not be immediately obvious – collapsed manhole covers, debris, vegetation etc. can trap a person or cause serious injury when submerged. Additionally, shallow fast-moving water can knock a physically fit grown man over.

## Flood Evacuation Plan

- 7.7 Tidal flooding is generally caused by a low pressure weather system creating storm-surges (or storm tides), chiefly via high speed winds. These winds (and to a certain extent, the low pressure) create a 'bulge' of water which, if it coincides with high tide, can generate very high, stormy, water levels. However, because this mechanism is well understood, it is very likely that early warning will be issued several hours before such an event occurs.
- 7.8 In the unlikely event of evacuation, site users should exit the site and head north-east along Wellington Road. Site users should travel along Wellington Road for approximately 440m to the intersection with Bath Street which is located in Flood Zone A. This road provides good links to the rest of Rhyl, will take users out of areas of high flood risk and has access to food, amenities and services. The proposed evacuation route is shown in more detail on Figure 21 below.



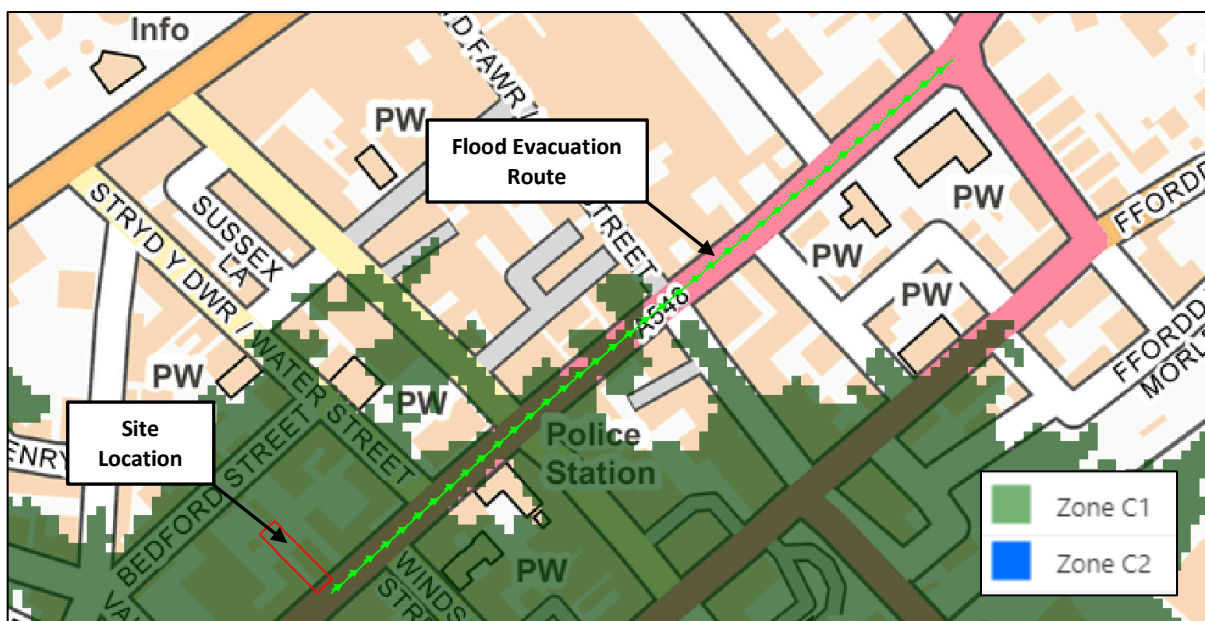


Figure 21: Site Evacuation Route (Note: Flood evacuation route shown in green)

- 7.9 In the 'summary of what TAN15 requires for highly vulnerable development (houses) to be considered acceptable' document states that:

*In respect to the residual risk to the development it should be designed so that over its lifetime (A1.5) in an extreme (1 in 1000 chance) event there would be less than 600mm of water on access roads and within properties, the velocity of any water flowing across the development would be less than 0.3m/second in access roads and 0.15m/second in properties, and the maximum rate of rise of floodwater would not exceed 0.1m/hour.*

- 7.10 No further information has been provided by NRW in regards to speed of onset or velocity of flood water. However, flood depths along the evacuation routes and on site would not exceed 0.4m during the 0.1% Annual Exceedance Probability (AEP) flood event. This is in line with NRW TAN15 guidance for safe access/egress which requires flood depths during the 0.1% AEP event to not exceed 0.6m.
- 7.11 Based on FD2321/TR1 guidance, emergency vehicles (fire engines) could move in flood depths of around 1m and remain controllable in depths of 0.5m with up to 5m/s of velocity. It should be noted that as the dominant source of flooding on site is tidal, flow velocities are unlikely to exceed 5m/s. In the extreme flood event (0.1% AEP), tidal flood events depths are less than 0.5m on site.
- 7.12 Given that velocities are relatively low and flood depths along the proposed evacuation route do not exceed 1m, it is likely that the access route would be suitable for use by emergency services.
- 7.13 The danger of driving through floodwaters is not widely publicised in the UK. The Highway Code does not give advice on driving in flood conditions, and there is no easily accessible information on the Environment Agency website. FD2320 and FD2321 guidance documents do not provide any information relating to hazard ratings for cars/vehicles.
- 7.14 In general, motorists should be aware of the dangers of driving in floodwater and should avoid driving in flooded areas.
- 7.15 If flood waters along the proposed evacuation route have exceeded 25cm, site users are advised to seek refuge at the upper floors on the site. It is anticipated that site users would not need to seek refuge for an extended period of time as flood waters should recede as the tide recedes.

- 7.16 As the site is located in an NRW Flood Alert Area, it should be possible to achieve prior evacuation in the event of a flood. In addition to this, as stated earlier, due to the nature of tidal flooding NRW aim to provide at least 6 hours lead time for flood warnings. As such, the importance of the site owner signing up to this service is once again reinforced.
- 7.17 As part of the assessment the primary risk of flooding was found to be residual as a result of breach/failure of the flood defences. Given the unexpected nature of a breach event, it is highly recommended that upon receipt of a flood warning the community centre is closed and vacated. The community centre should not be reopened until the flood warning has been lifted or has been deemed safe by emergency services.

## 8. Off Site Impacts

### Impact to Flood Risk Elsewhere

- 8.1 It is understood that the development is for the conversion of a vacant public house to a community centre.
- 8.2 There will be negligible change in the built footprint as a result of the proposed development, as the application is for a 'change of use'.
- 8.3 As such, there will be **negligible impact to flood risk elsewhere** as a result of the proposed development.

### Generation of Runoff

- 8.4 As the development is for the conversion of an existing building with limited reconstruction works it is recommended that the site developer discharge runoff generated by the proposed development via the existing drainage network.
- 8.5 As such, there will be **no increase in runoff** generated as a result of the proposed development.

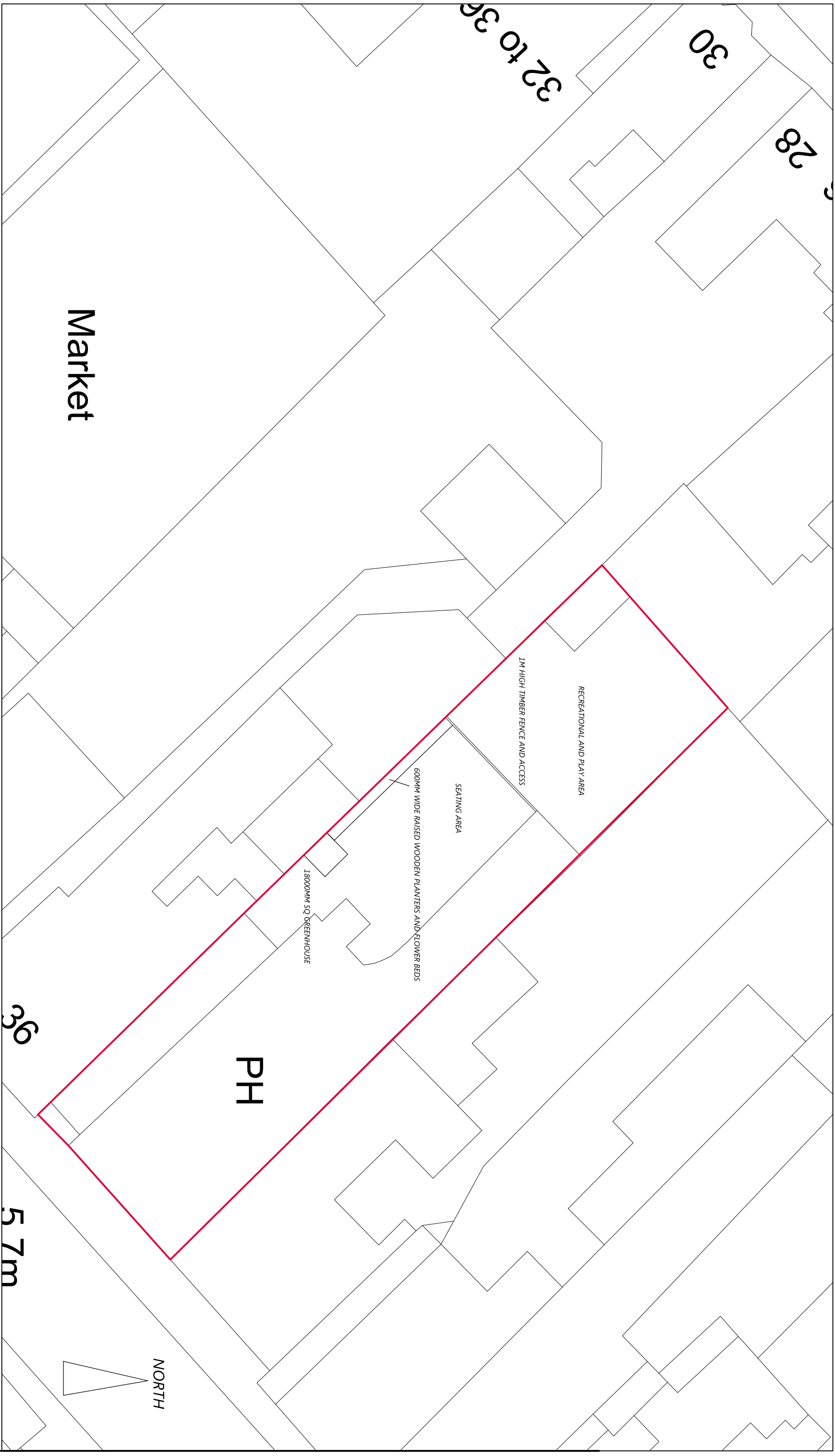
## 9. Conclusion

- 9.1 Ambiental Environmental Assessment has been appointed by Brighter Futures to undertake a Technical Advice Note 15 (TAN15) compliant Flood Consequence Assessment (FCA) for the proposed development at 34 Wellington Road, Rhyl, LL18 1BN.
- 9.2 The site is currently a vacant commercial property (previously a Public House). It is understood that the development is for the conversion of a vacant public house to a community centre.
- 9.3 With reference to the Natural Resources Wales (NRW) Development Advice Map, the proposed development is located within Flood Zone C1 (areas of the floodplain served by significant defence infrastructure). According to the NRW detailed online maps, the site also falls within Flood Zone 2 (with a greater than 0.1% chance of annual fluvial flooding) and Flood Zone 3 (with a greater than 1% chance of annual fluvial flooding).
- 9.4 The proposed development is considered “Highly Vulnerable” under the TAN15 development category types, therefore there is a requirement to justify highly vulnerable development within Zone C1. The following should be noted:
- Policy BSC 2 of the Denbighshire Adopted Local Plan states that brownfield development should be prioritised. It is considered important to emphasise redevelopment of brownfield sites, where possible, in line with wider objectives for regeneration in the North Wales Coast Strategic Regeneration Area.
  - The community centre will address the objectives set out in the Denbighshire Adopted Local plan for (PSE8) states *‘We also need to improve the environment around these homes to create a sense of neighborhood and community. To achieve this in a time of significant public sector financial constraints, we will need to promote community engagement in civic initiatives to improve local places and amenities.’*
  - The site is defended. The topographic levels/defence heights across the frontage of Rhyl have been shown to be higher than modelled still water flood levels, and therefore the site has been shown to not flood during the 200+CC tidal flood events.
  - The North West England and North Wales Shoreline Management Plan (2012) shows that the defences benefitting the site are classed as ‘hold the line’ and are expected to be upgraded and maintained for the foreseeable future.
  - Therefore, the risk of flooding to the site is residual as a result of failure of the defences.
  - The existing public house on site is classified as ‘highly vulnerable’. The proposed conversion to community centre (highly vulnerable) will not increase the vulnerability on site. Furthermore, the proposed community centre will not increase the number of people located within a flood risk area compared to the existing public house.
  - The residual risk of breach can be appropriately managed by early warning systems and closing the community centre upon receipt of a flood warning and by implementing flood resilience measures to ensure the community centre can recover from a flood event in a quick and efficient manner.
- 9.5 NRW have provided flood levels for the 1:200 year return period (RP) tidal flood event (including various epochs of sea level rise). This data shows the site to be partially inundated by levels of less than 0.19m for the present day 200 year RP respectively. For the 2111 epoch, the 200 year RP tidal flood level is increased to 6.38mAOD which corresponds to a maximum flood depth of 0.79m.

- 9.6 However, it should be noted that these flood levels provided are simply extreme still water levels. As demonstrated within Figure 7, the topographic levels across the frontage of Rhyl are higher than this still water level. Furthermore, the site is located within Flood Zone C1, which is defined as an area served by significant defence infrastructure. **Therefore, it is highly unlikely that the proposed development will be affected by these still water flood levels. The main risk of flooding to the site would be in the event of breach/failure of defences.**
- 9.7 The risk of flooding to the site from surface water and sewer flooding is deemed to be relatively low, whilst the risk of flooding to the site from groundwater is deemed to be relatively low to moderate. To mitigate these sources of flooding, a number of measures have been recommended to manage the associated risks.
- 9.8 There will be a negligible change in the built footprint as a result of the proposed development, as the application is for a 'change of use'.
- 9.9 As there is no material amendment to the main buildings on site and existing drainage serves the existing property it is recommended that the site developer discharge runoff generated by the proposed development via the existing drainage network.
- 9.10 As the site is located in an NRW Flood Alert Area, it should be possible to achieve prior evacuation in the event of a flood. In addition to this, as stated earlier, due to the nature of tidal flooding NRW aim to provide at least 6 hours lead time for flood warnings. As such, the importance of the site owner signing up to this service is once again reinforced.
- 9.11 As part of the assessment the primary risk of flooding was found to be residual as a result of breach/failure of the flood defences. Given the unexpected nature of a breach event, it is highly recommended that upon receipt of a flood warning the community centre is closed and vacated. The community centre should not be reopened until the flood warning has been lifted or has been deemed safe by emergency services.
- 9.12 As such, the following mitigation measures are recommended:
- all plumbing insulation to be of closed-cell design;
  - non-return valves to be fitted to drain and sewer outlets;
  - anti-syphon fitted to all toilets;
  - the proposed development is located within an NRW Flood Alert Service Area. Management staff will be required to sign up to this service.

Following the guidelines contained within the TAN15, the proposed development is considered to be suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

## Appendix I - Site Plans



© COPYRIGHT: ~~PPA~~ CHECK DIMENSIONS ON SITE. REPORT ANY ERRORS OR OMISSIONS TO ARCHITECT. PLANNING PURPOSE ONLY.

**Parry Davies Architects.**

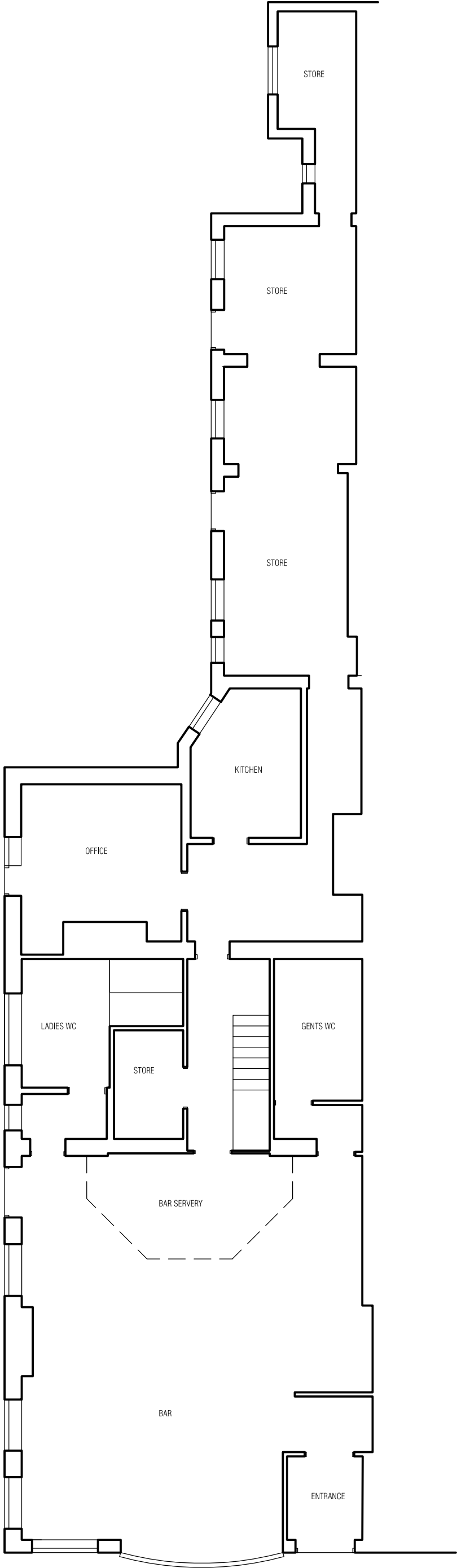
**Chartered Architects.**

PROJECT TITLE	DATE	SCALE	DRWN	CHK
34 WELLINGTON ROAD RHYL	FEB 2019	1:200@A3	RSG	

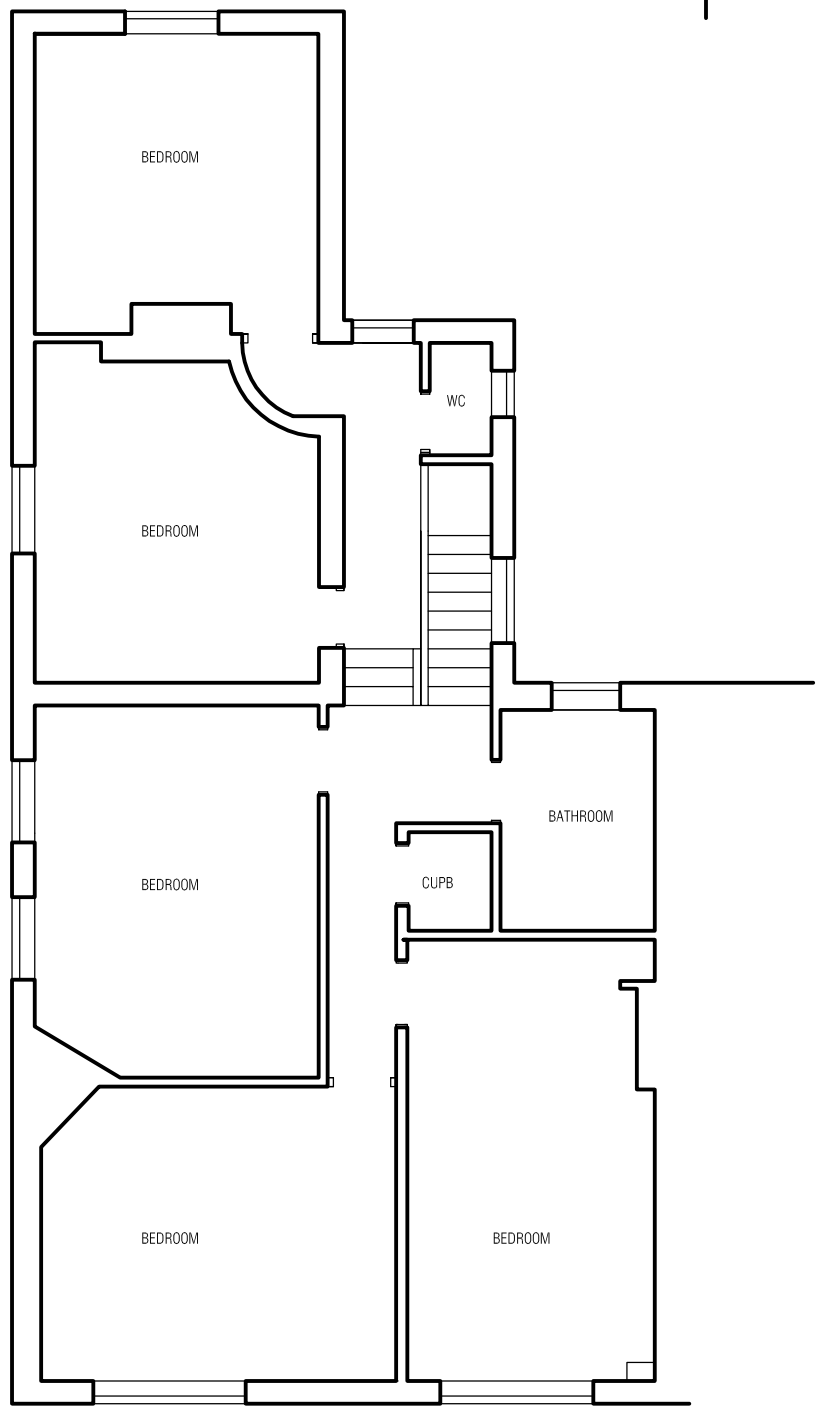
DRWG. TITLE	DRWG. NOS.	REV
PROPOSED SITE LAYOUT PLAN	19.5944/SL1	

Studio 55:20 North Wales Buisness Park Abergele LL18 7LJ

Tel:01745 585517 E-mail: PDPArchitects@aol.com



GROUND FLOOR PLAN



FIRST FLOOR PLAN

© COPYRIGHT. ~~DO NOT SCALE~~ CHECK DIMENSIONS ON SITE. REPORT ANY ERRORS OR OMISSIONS TO ARCHITECT. PLANNING PURPOSE ONLY

**Parry Davies Architects.**

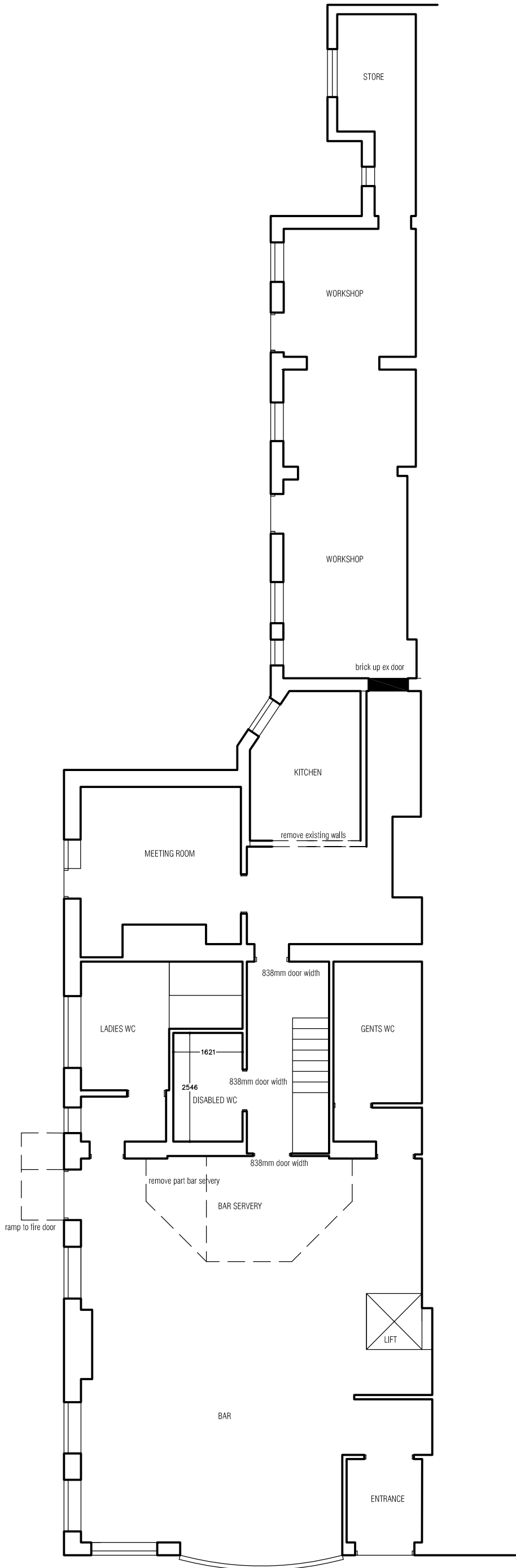
**Chartered Architects.**

PROJECT TITLE	34 WELLINGTON ROAD RHYL	DATE	FEB 2019	SCALE	1:100@A3	DRWN	RSG	CHK
DRWG. TITLE	EXISTING FLOOR LAYOUT PLANS	DRWG. NOS.	19.5944/1					REV

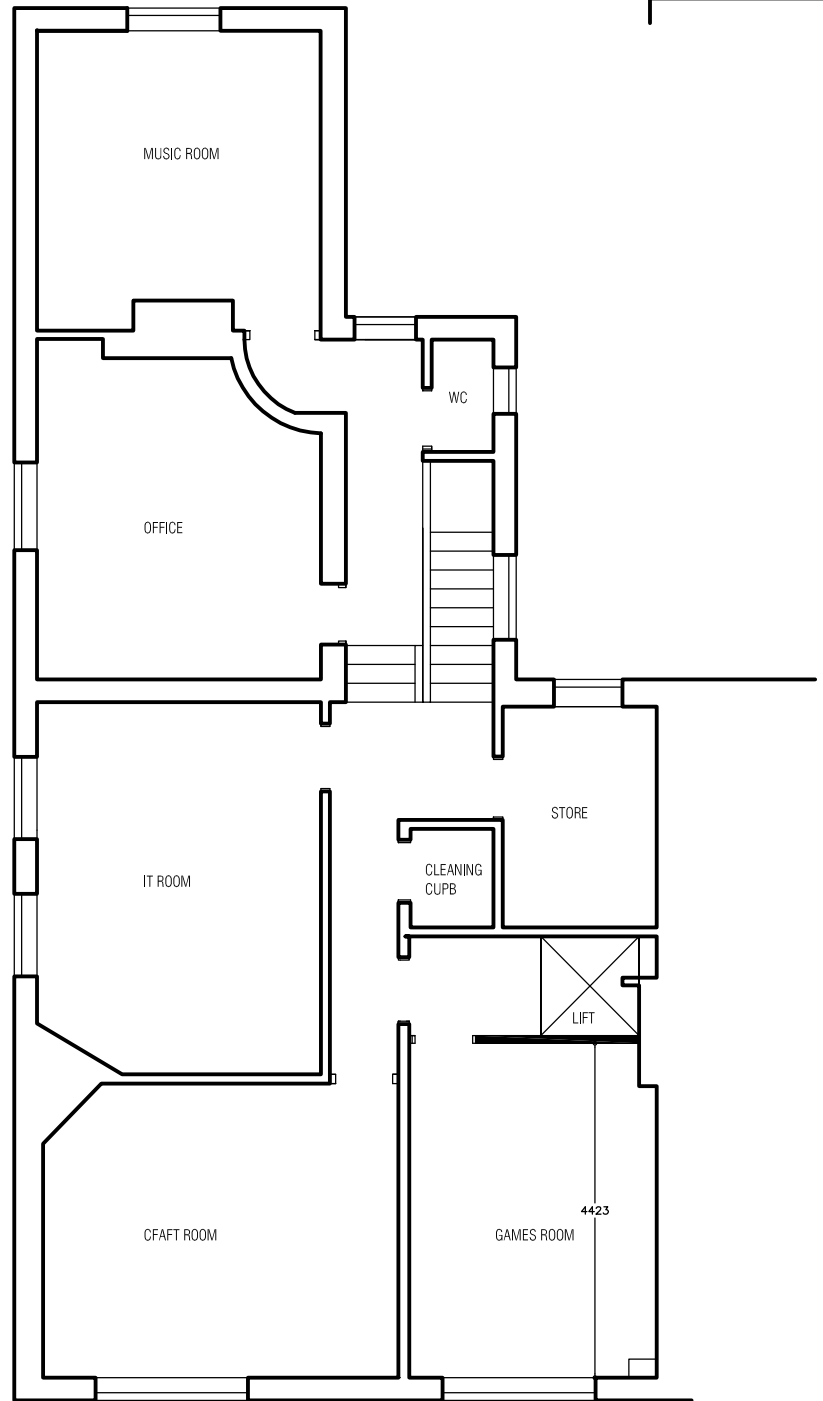
Studio 55:20 North Wales Buisness Park Abergele LL18 7LJ

Tel:01745 585517 E-mail: PDPArchitects@pd.com





GROUND FLOOR PLAN



FIRST FLOOR PLAN

© COPYRIGHT. ~~NOT FOR~~ CHECK DIMENSIONS ON SITE. REPORT ANY ERRORS OR OMISSIONS TO ARCHITECT. PLANNING PURPOSE ONLY

**Parry Davies Architects.**

**Chartered Architects.**

PROJECT TITLE  
34 WELLINGTON ROAD RHYL

DATE  
FEB 2019

SCALE  
1:100@A3

DRWN  
RSG

CHK

DRWG. TITLE  
PROPOSED FLOOR LAYOUT PLANS

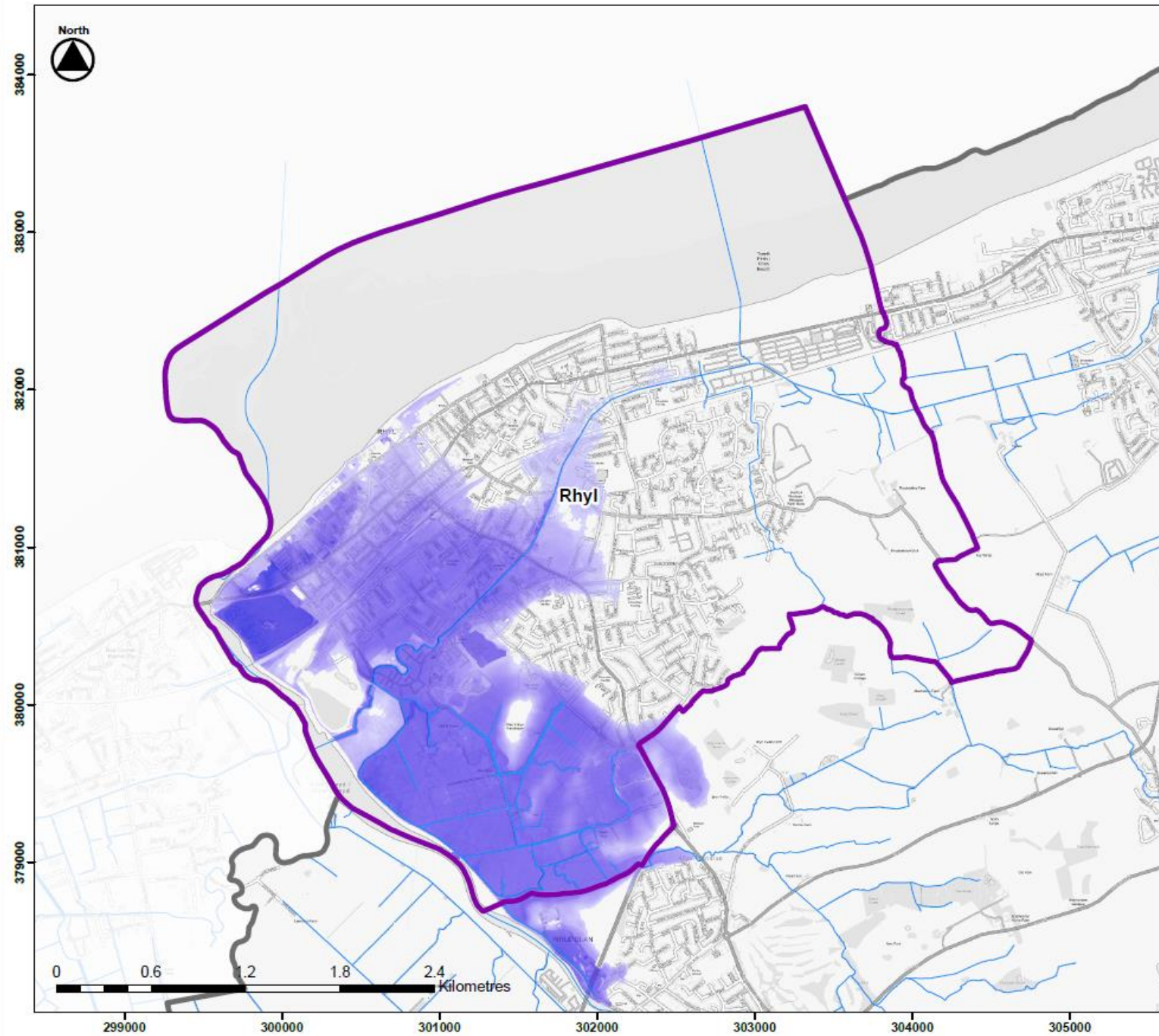
DRWG. NOS.  
19.5944/2

REV

Studio 55:20 North Wales Buisness Park Abergele LL18 7LJ

Tel:01745 585517 E-mail: PDPArchitects@pd.com

## Appendix II - NRW Data



Rhyl

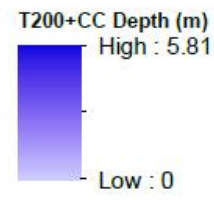
**STRATEGIC FLOOD CONSEQUENCE ASSESSMENT**

For  
DENBIGHSHIRE COUNTY COUNCIL

Please select a data type from the dropdown menu below that you wish to view:

Rhuddlan Ciwyd Breach T200+CC Depths

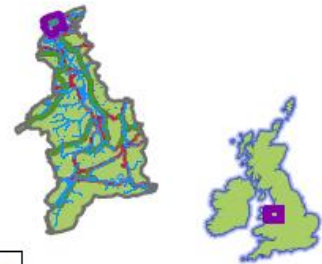
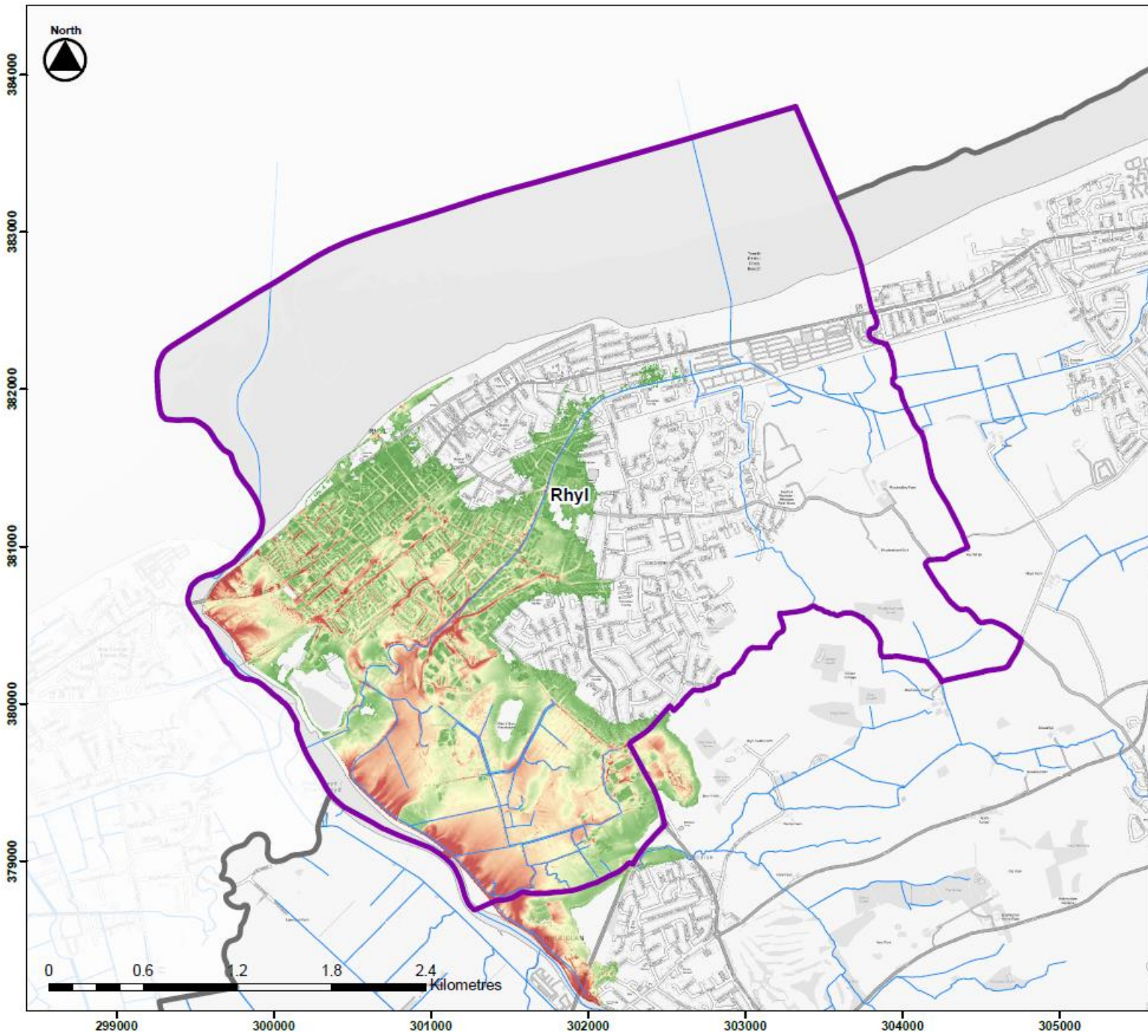
- Settlement Boundary
- DCC Boundary
- Detailed River Network



Show Settlement Reference Labels



Contains Ordnance Survey data © Crown copyright and database right (2017)






Rhyll

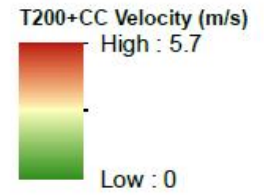
**STRATEGIC FLOOD CONSEQUENCE ASSESSMENT**

For  
DENBIGHSHIRE COUNTY COUNCIL

Please select a data type from the dropdown menu below that you wish to view:

Rhuddlan Clwyd Breach T200+CC Velocity

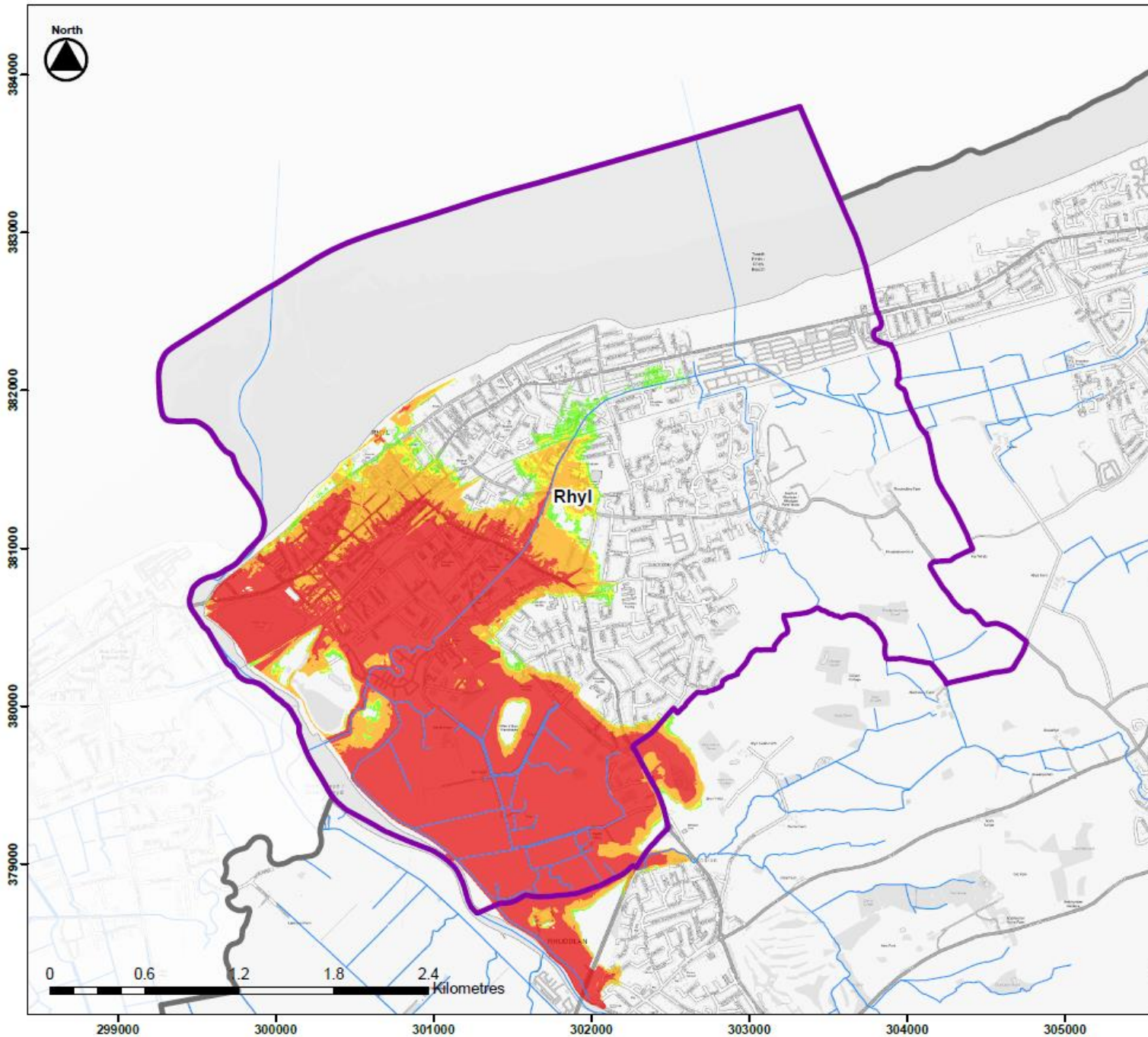
-  Settlement Boundary
-  DCC Boundary
-  Detailed River Network



Show Settlement Reference Labels



Contains Ordnance Survey data © Crown copyright and database right (2017)



Rhyll

**STRATEGIC FLOOD CONSEQUENCE ASSESSMENT**  
For  
DENBIGHSHIRE COUNTY COUNCIL

Please select a data type from the dropdown menu below that you wish to view:

Rhuddlan Clwyd Breach T200+CC Hazard

- Settlement Boundary
- DCC Boundary
- Detailed River Network

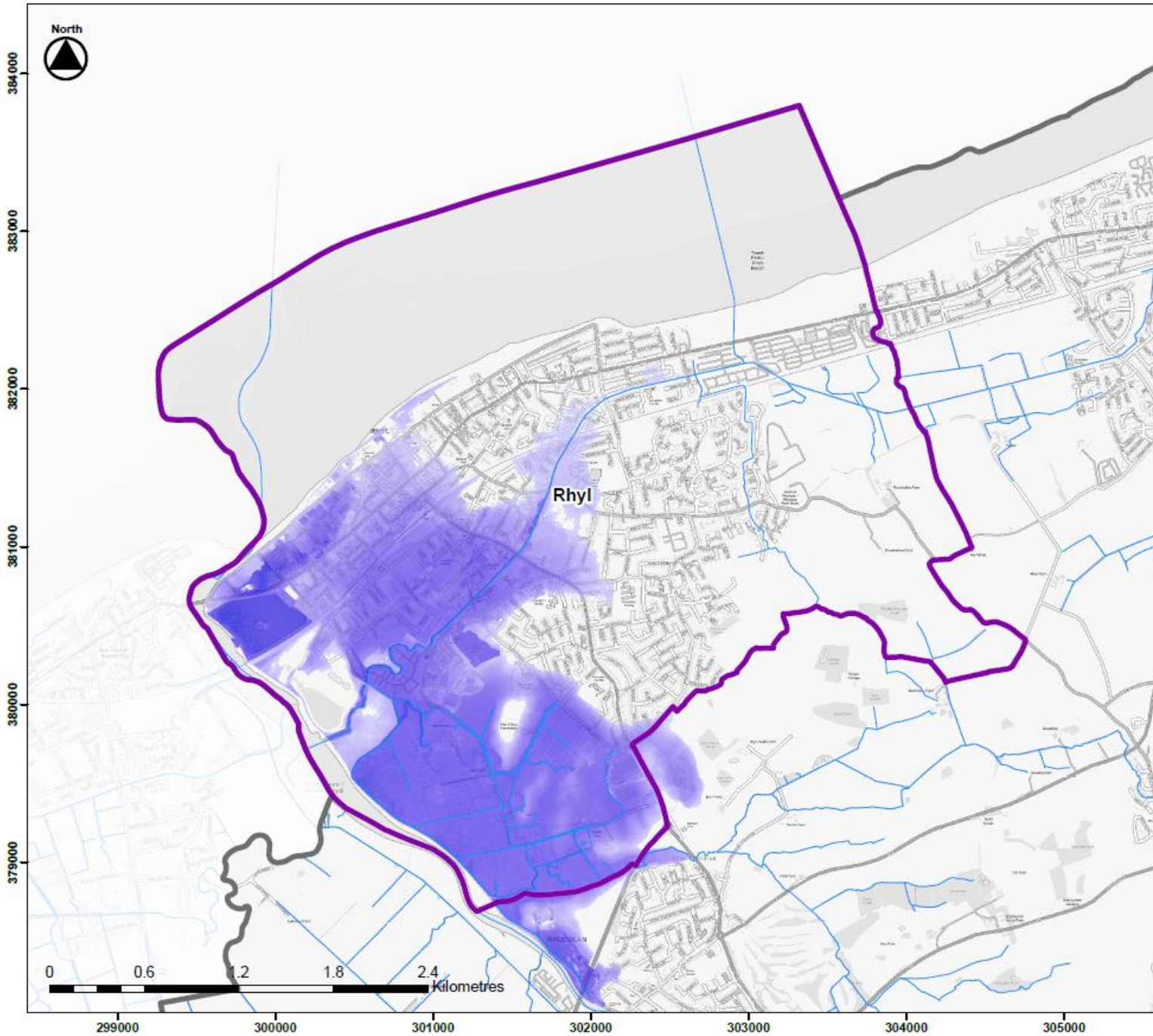
**T200+CC Hazard**

- Low
- Moderate
- Significant
- Extreme

Show Settlement Reference Labels



Contains Ordnance Survey data © Crown copyright and database right [2017]



Rhyl

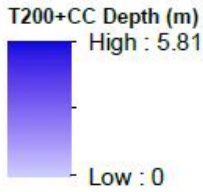
**STRATEGIC FLOOD CONSEQUENCE ASSESSMENT**

For  
DENBIGHSHIRE COUNTY COUNCIL

Please select a data type from the dropdown menu below that you wish to view:

Rhuddlan Marine Lake Breach T200+CC Depths

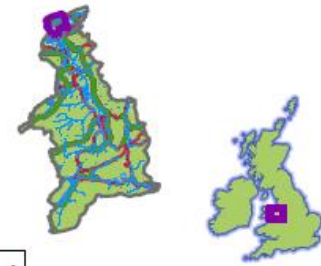
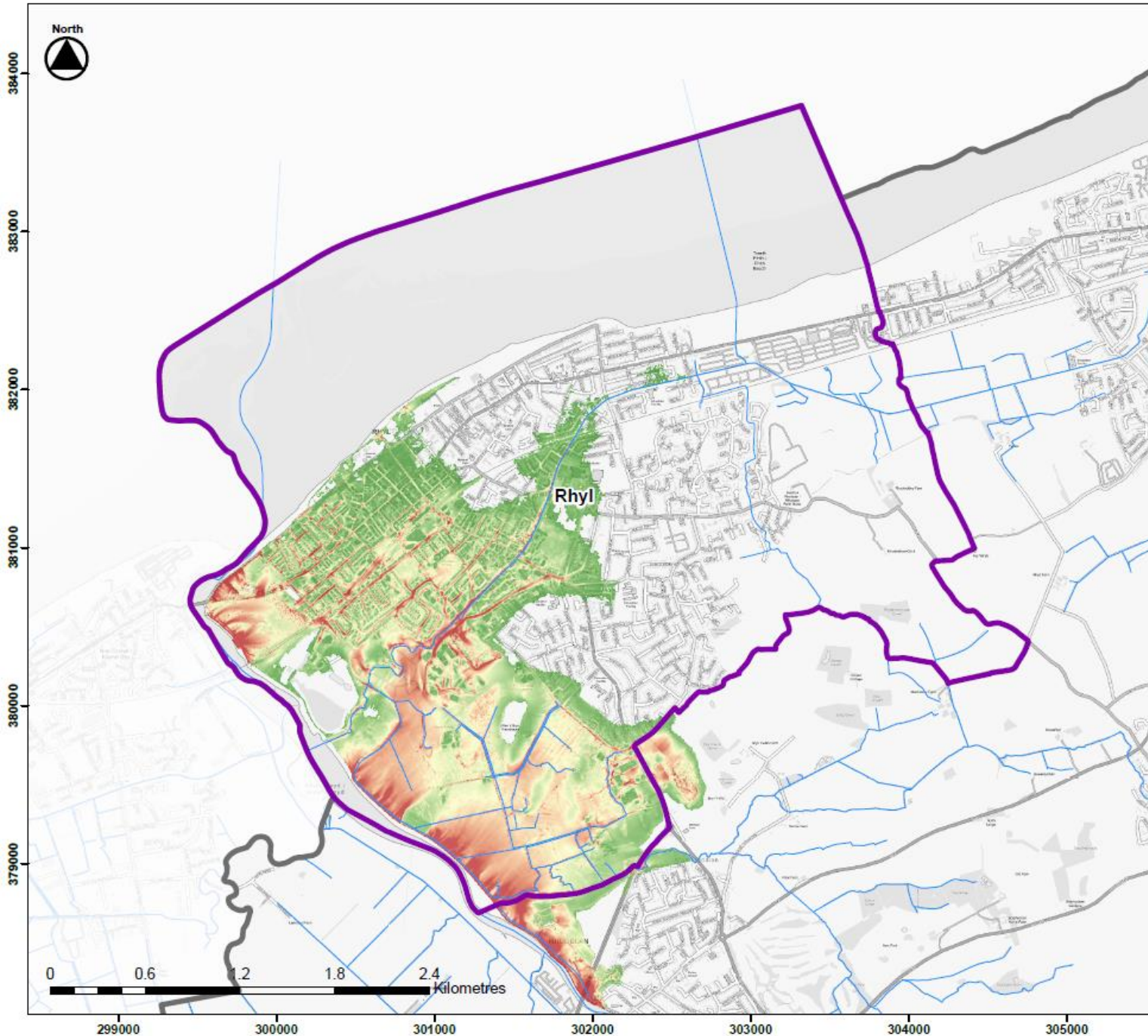
-  Settlement Boundary
-  DCC Boundary
-  Detailed River Network



Show Settlement Reference Labels



Contains Ordnance Survey data © Crown copyright and database right (2017)



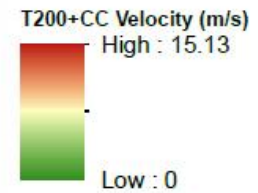
Rhyll

**STRATEGIC FLOOD CONSEQUENCE ASSESSMENT**  
 For  
 DENBIGHSHIRE COUNTY COUNCIL

Please select a data type from the dropdown menu below that you wish to view:

Rhuddlan Marine Lake Breach T200+CC Velocity

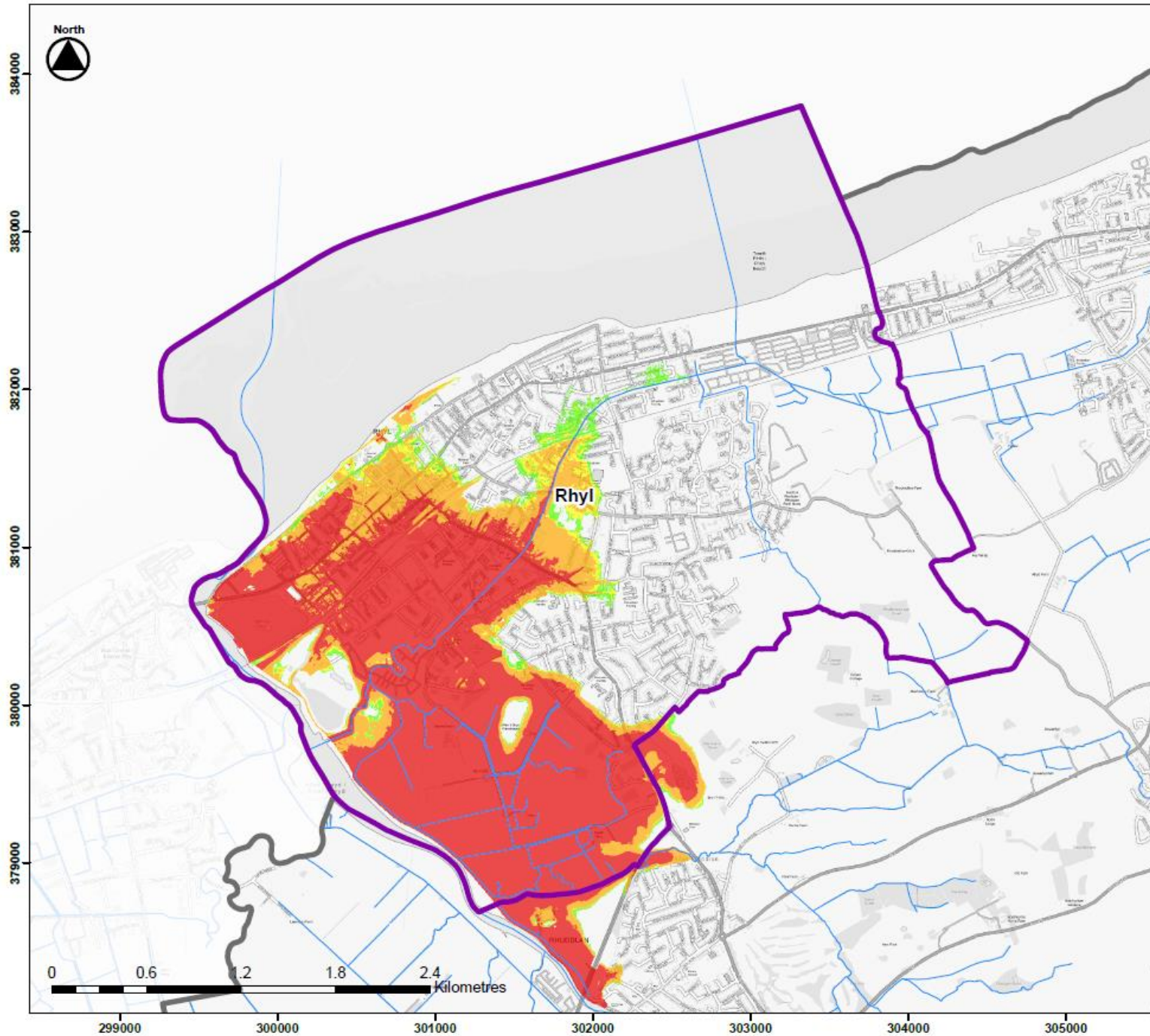
-  Settlement Boundary
-  DCC Boundary
-  Detailed River Network



Show Settlement Reference Labels



Contains Ordnance Survey data © Crown copyright and database right (2017)



Rhyll

**STRATEGIC FLOOD CONSEQUENCE ASSESSMENT**  
For  
DENBIGHSHIRE COUNTY COUNCIL

Please select a data type from the dropdown menu below that you wish to view:

Rhuddlan Marine Lake Breach T200+CC Hazard

- Settlement Boundary
- DCC Boundary
- Detailed River Network

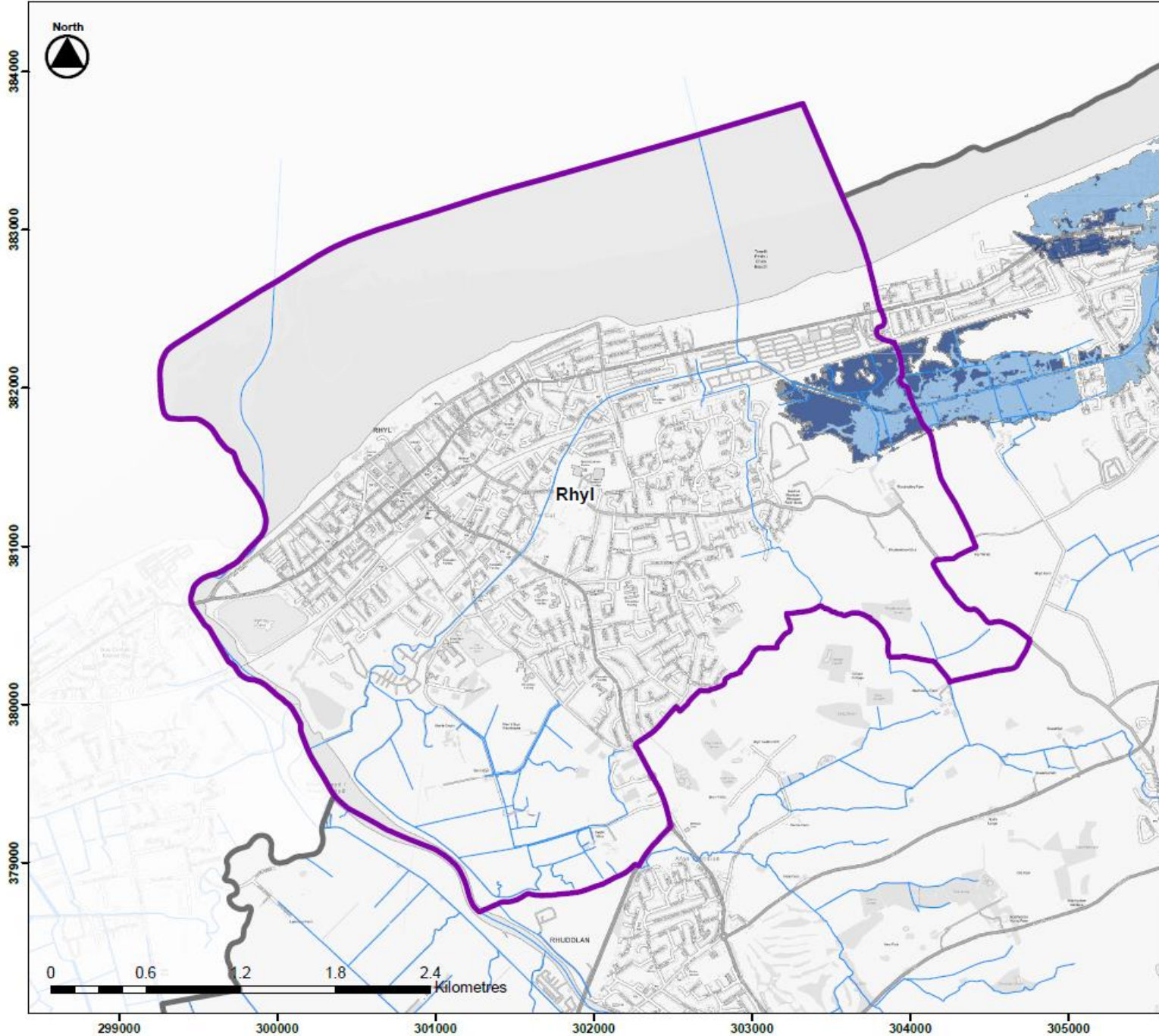
- T200+CC Hazard**
- Low
  - Moderate
  - Significant
  - Extreme

Show Settlement Reference Labels



Contains Ordnance Survey data © Crown copyright and database right [2017]










Rhyll

**STRATEGIC FLOOD CONSEQUENCE ASSESSMENT**  
For  
DENBIGHSHIRE COUNTY COUNCIL

Please select a data type from the dropdown menu below that you wish to view:

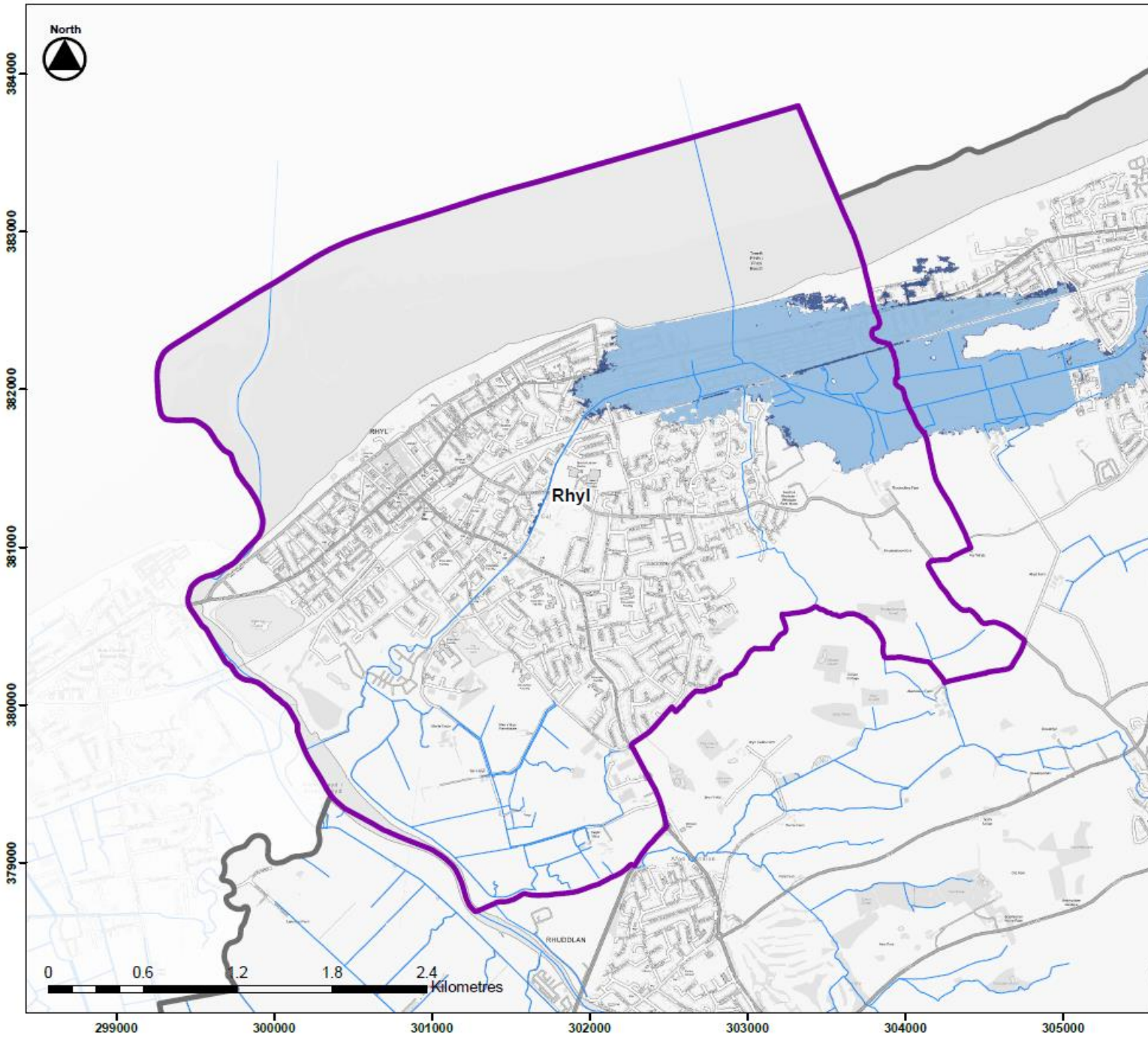
Frestatyn Breach

-  Settlement Boundary
-  DCC Boundary
-  Detailed River Network
-  T200cc Outline
-  T1000cc Outline

Show Settlement Reference Labels



Contains Ordnance Survey data © Crown copyright and database right (2017)








Rhyll

**STRATEGIC FLOOD CONSEQUENCE ASSESSMENT**  
For  
DENBIGHSHIRE COUNTY COUNCIL

Please select a data type from the dropdown menu below that you wish to view:

Rhyll Breach

-  Settlement Boundary
-  DCC Boundary
-  Detailed River Network
-  T200cc Outline
-  T1000cc Outline

Show Settlement Reference Labels



Contains Ordnance Survey data © Crown copyright and database right [2017]