Coverack Road - Flood Consequences Assessment

P02

December 2024

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Contract

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This report describes work commissioned by Newport City Homes, by an instruction dated 2nd October 2023. The Client's representative for the contract was David Cox of Newport City Homes. Erica Skinner of JBA Consulting carried out this work.

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Abbreviations

1D	One Dimensional (modelling)
2D	Two Dimensional (modelling)
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
BGS	British Geological Survey
CFB	Coastal Flood Boundary
FCA	Flood Consequence Assessment
FMfP	Flood Map For Planning
FRM	Flood Risk Management
LFRMS	Local Flood Risk Management Strategy
LiDAR	Light Detection And Ranging
NGR	National Grid Reference
NRW	Natural Resources for Wales
OS	Ordnance Survey
OS NGR	Ordnance Survey National Grid Reference
PFRA	Preliminary Flood Risk Assessment
RCP	Representative Concentration Pathway
SMP	Shoreline Management Plan
TUFLOW	Two-dimensional Unsteady FLOW (a hydraulic
UKCP	United Kingdon Climate Projections

1 Introduction

1.1 Terms of Reference

JBA Consulting (JBA) were commissioned by Newport City Homes to prepare a Flood Consequence Assessment (FCA) to support a planning application for a residential development on Coverack Road, Newport. This development comprises Phase 2 of the Galliford's Yard development site.

1.2 FCA Requirements

This FCA follows Welsh Government guidance on development and flood risk set out in Technical Advice Note 15: Development and Flood Risk (TAN-15). Where appropriate, the following aspects of flood risk should be addressed in all planning applications over their expected lifetime:

- The likely mechanisms of flooding
- The likely source of flooding
- The depths of flooding through the site
- The speed of inundation of the site
- The rate of rise of flood water through the site
- Velocities of flood water across the site
- Overland flow routes
- The effect of access and egress and infrastructure, for example, public sewer outfalls, combined sewer outflows, surface water sewers and effluent discharge pipes from wastewater treatment works
- The impacts of the development in terms of flood risk on neighbouring properties and elsewhere on the floodplain.

2 Site Description

2.1 Site Summary

The application is for the development of a residential apartment block on the former Galliford's Yard site, Coverack Road, close to the city centre of Newport. Figure 2-1 shows the location of the site, which is approximately 0.16ha in area. The site was previously used for light industrial use and is therefore brownfield land that has been vacant for a number of years.

The site is located in a mixed residential and industrial area, with residential properties to the north and east of the site, and the River Usk to the south-west. George Street Bridge crosses above the site's north-western perimeter. To the north of George Street Bridge, Phase One of the Galliford's Yard development is located, comprising of two residential blocks, containing a total of 76 apartments.

Table 2-1 Site Summary

Parameter	Description
Site Name	Galliford's Yard, Phase 2
Site area	Approximately 0.16ha
Existing land use	Brownfield site
Purpose of development	Residential Development
OS NGR	ST319877
Local Planning Authorities	Newport City Council
Lead Local Flood Authority	Newport City Council

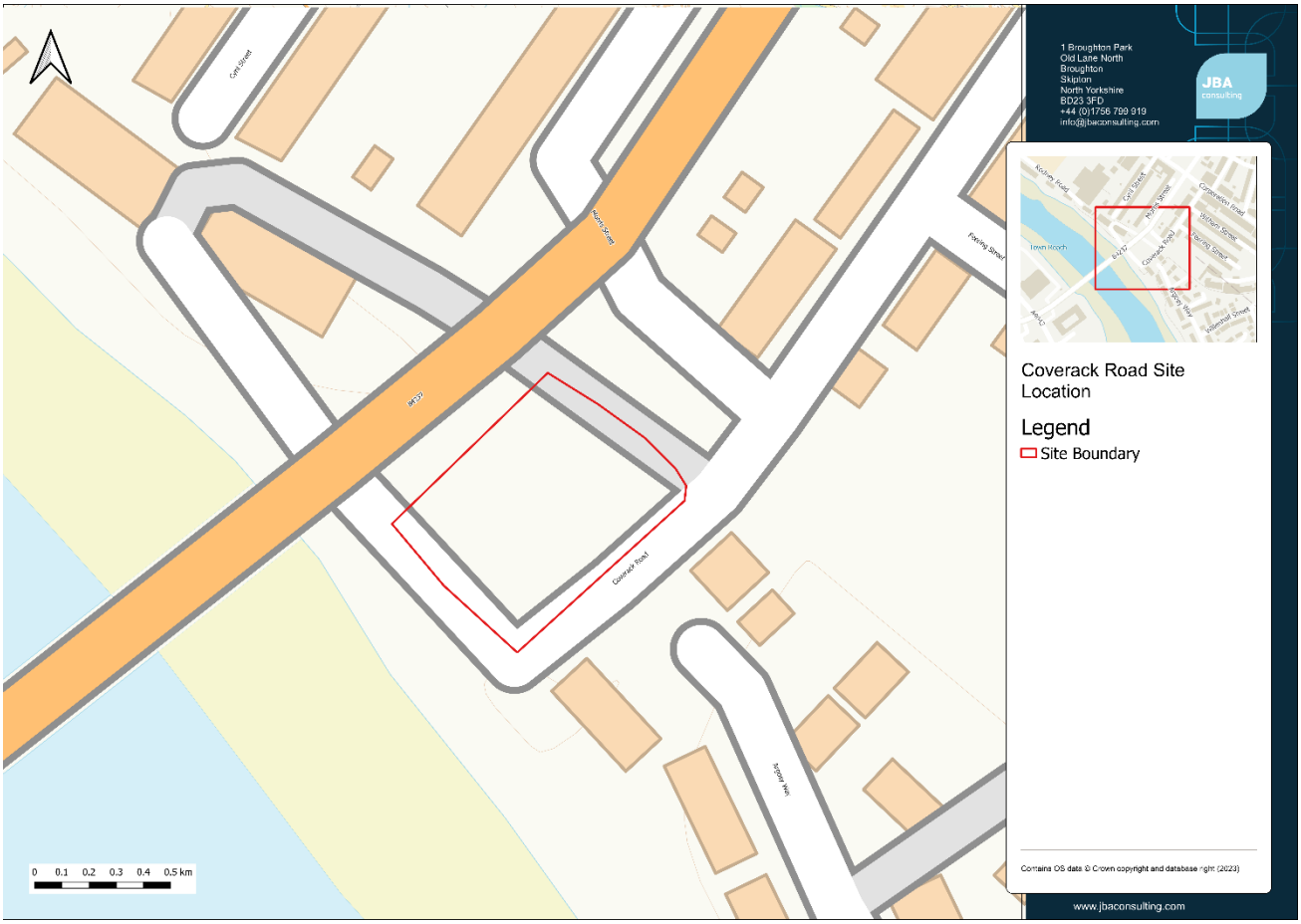


Figure 2-1 Site Location

2.2 Site Topography

The proposed development site is currently a vacant brownfield site. It was formerly the site of a light industrial unit. However, the site has been vacant for a number of years now. It is currently being used as a compound for the Phase 1 development to the north of George Street Bridge.

Figure 2-2 shows Natural Resources Wales (NRW) Open Source 1m Light Detection and Ranging (LiDAR) data, highlighting that elevations on the site remain fairly level at approximately 10.2mAOD. There is a slight increase in levels to the southwest of the site to 10.79mAOD, however this is likely due to the temporary storage of materials.

There are no proposals to change ground levels for the proposed development.

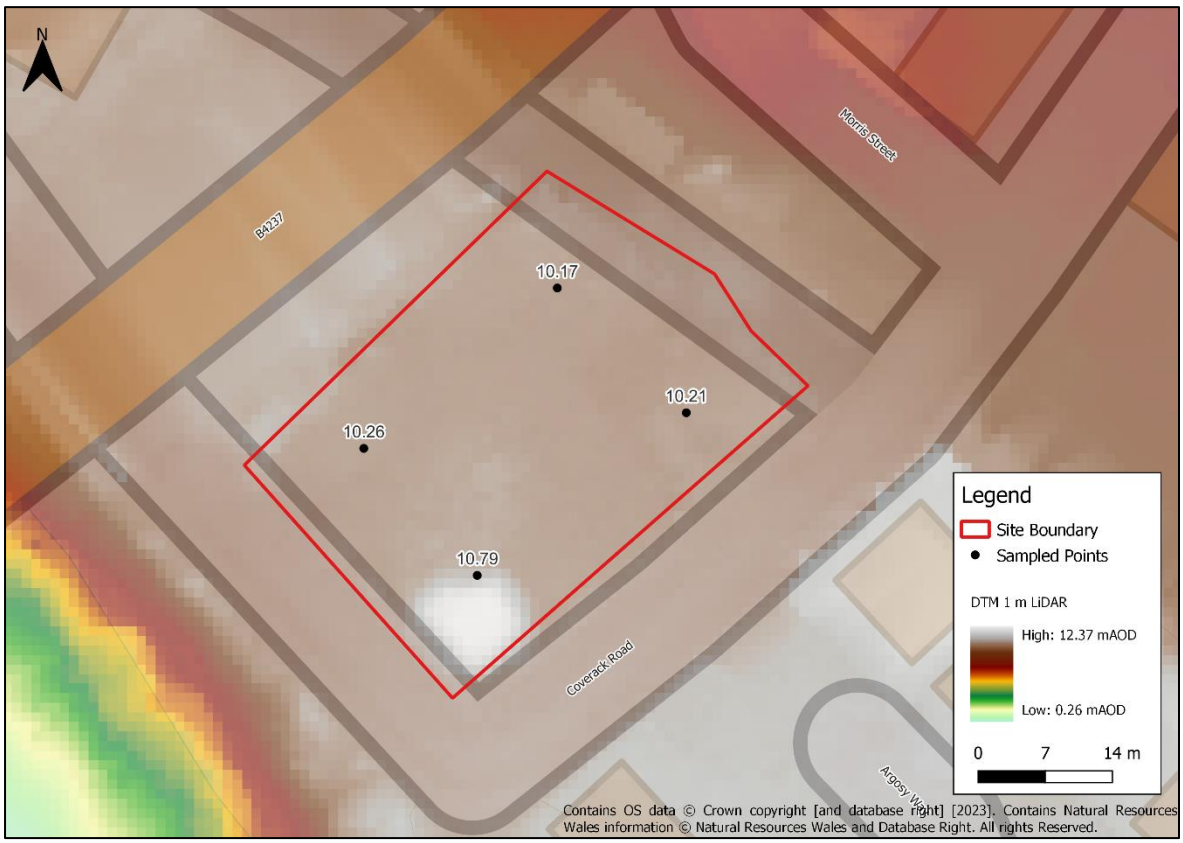


Figure 2-2 LiDAR Topographic data from NRW (1m resolution) with sample points

2.3 Soils and Geology

The geology of the site has been assessed using the British Geological Survey (BGS) Geology of Britain Viewer[1]. The bedrock is shown to be St Maughans Formation, comprised of Argillaceous rocks and sandstone. The superficial geology is formed of tidal flat deposits comprised of clay and silt.

The soils on site have been assessed on the Cranfield University Soilscape viewer[2] and are shown to be loamy and clayey soils of coastal flats with naturally high groundwater.

Due to the brownfield and hardstanding existing nature of the site, natural infiltration is unlikely to contribute to the existing drainage and the site is likely to be characterised by made-ground up to significant depths.

2.4 Watercourses

The site lies on the left bank of the River Usk. The River Usk is tidally influenced, with the coast located 5.5km to the south. The Spytty Pill is located approximately 710m to the South-East of the Galliford's Yard site, where it joins the River Usk. No watercourses cross the proposed development site.

1 https://www.bgs.ac.uk/map-viewers/geoindex-onshore/
2 Cranfield Soil Scapes Viewer. http://www.landis.org.uk/soilscapes/

2.5 Development Proposal

The proposal is for a block of 40 residential apartments, as shown in Figure 2-3 and Appendix 0.

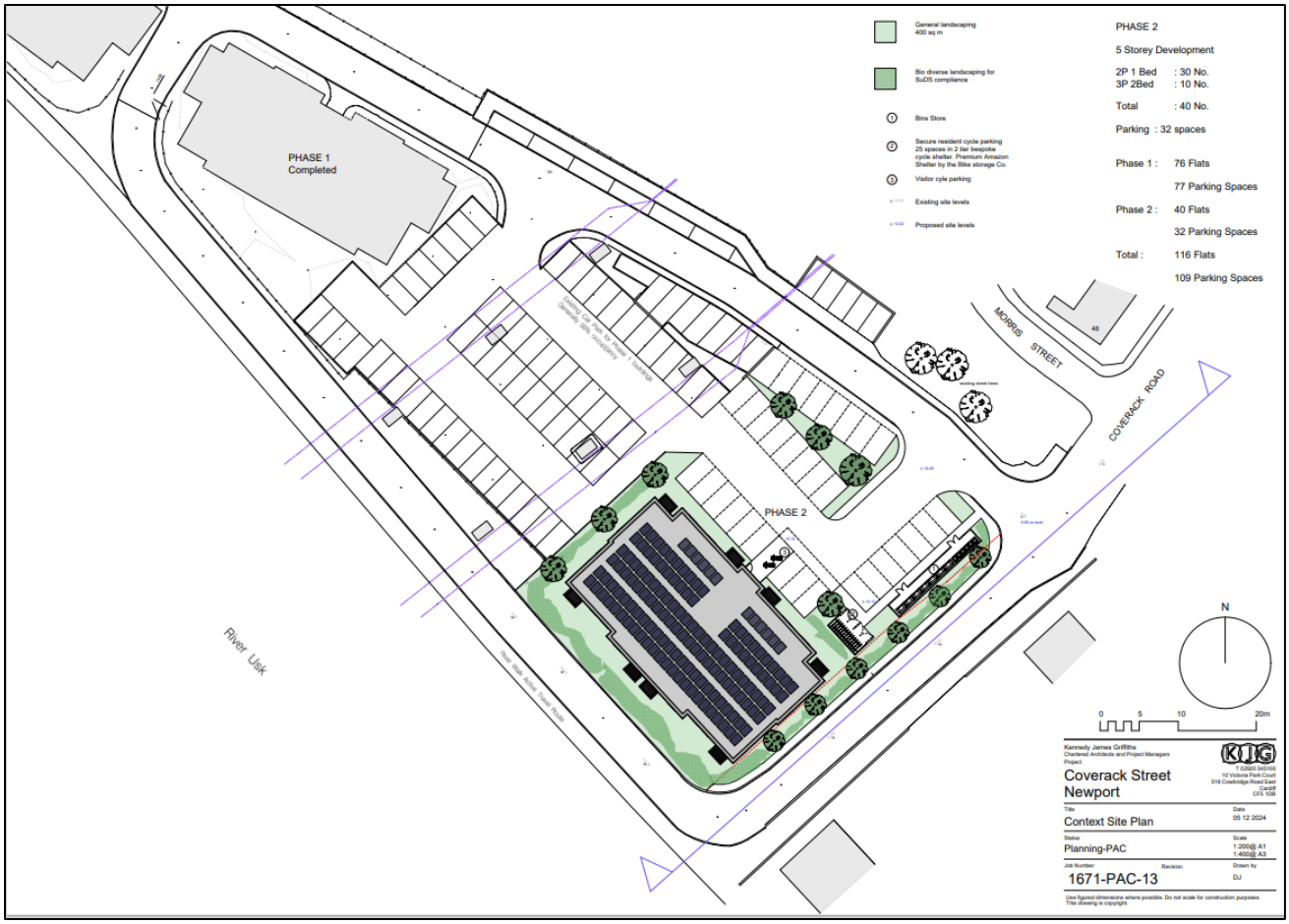


Figure 2-3 Development Plan

3 Planning Policy and Flood Risk

3.1 Planning Context

Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. These policies have the aim that all development in Wales is sustainable and improve the social, economic, environmental, and cultural wellbeing of Wales as set out in the Wellbeing of Future Generations Act 2015.

Technical Advice Note 15 (TAN-15), introduced by the Welsh Government in 2004, provides technical guidance relating to development planning and flood risk in Wales. The initial requirements of TAN-15 are to identify the vulnerability classification(s) and flood zones relevant to the proposed development, and to apply this information to the application of the justification tests.

An update for TAN-15 was released in October 2021 and was due to come into force on the 1st December 2021. However, Welsh Government subsequently suspended the implementation of the new TAN-15 until early 2024. Although the new TAN-15 is not a material consideration, Welsh Government and NRW advise that some consideration is given to the draft Flood Map for Planning (FMfP) as best available information. Therefore, where a site is located in a FMfP flood risk zone it is recommended that an FCA is carried out.

As a result of the above, both the DAM and the FMfP are considered as part of this FCA.

3.2 Vulnerability Classification

TAN-15 assigns one of three flood risk vulnerability classifications to a development, as shown in Table 3-1. The proposed development is for a residential development and is consequently classified as 'Highly Vulnerable' development.

Table 3-1 Development Categories Defined by TAN-15

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 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.

3.3 Development Advice Map Classification

The Development Advice Map (DAM) is used to trigger different planning actions based on a precautionary assessment of flood risk.

Figure 3-1 shows that the entire site is located within DAM Zone B, which is described as areas of the floodplain known to have flooded in the past evidenced by sedimentary deposits.

Classification Zone B is 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.

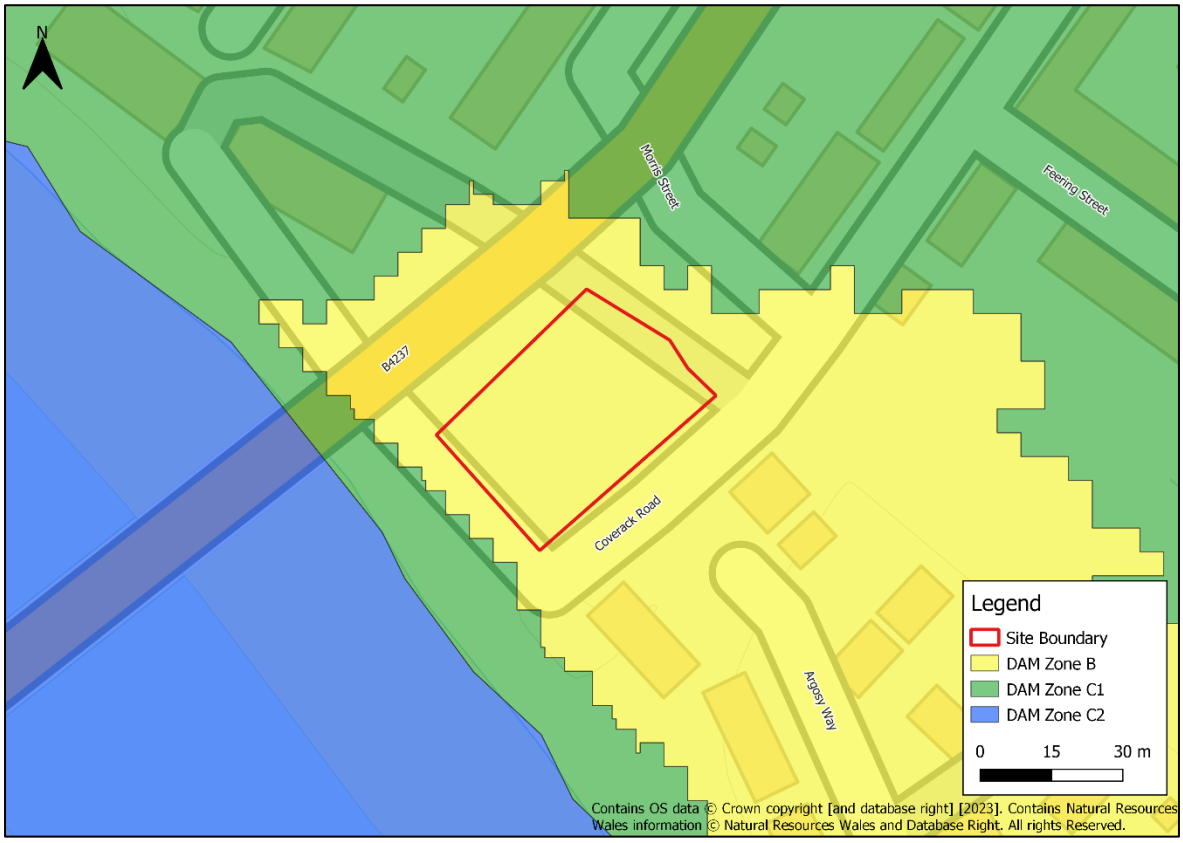


Figure 3-1 Development Advice Map

3.4 Flood Map for Planning Classifications

The new TAN-15 will replace the DAM with the Flood Map for Planning (FMfP), which shall define the appropriate planning actions under the new TAN-15 when it comes into effect in 2024. Whilst the new TAN-15 is not a material consideration until implemented, it does illustrate the current policy thinking of Welsh Government and in some cases the FMfP may constitute best available information. Consequently, information on the FMfP is provided for information only.

3.4.1 Flood Map for Planning - Rivers

As shown in Figure 3-2, the proposed development site is located within Flood Zone 1 of the Flood Map for Planning for the Rivers. Flood Zone 1 represents areas which have less than a 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.

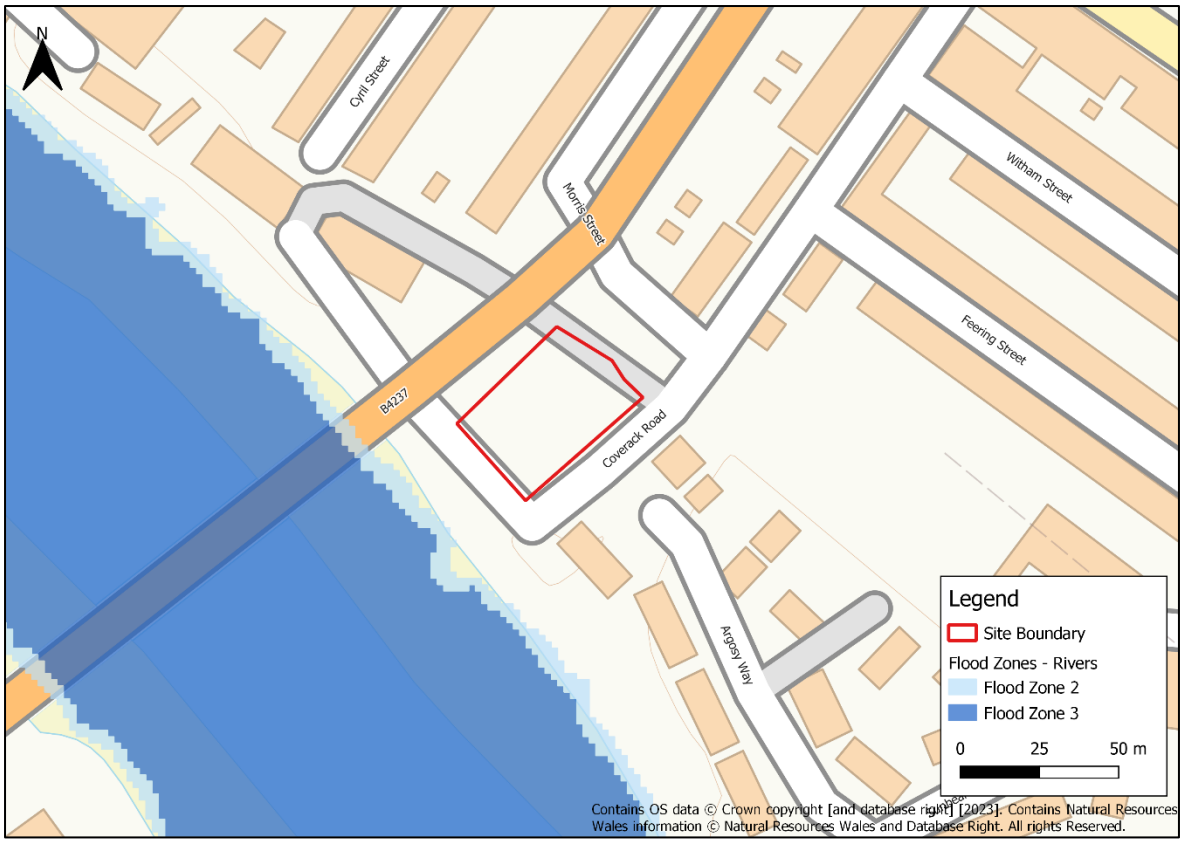


Figure 3-2 Flood Map for Planning – Rivers

3.4.2 Flood Map for Planning - Sea

Figure 3-3 also shows that the site is located within Flood Zone 1 of the Flood Map for Planning for the Sea. Flood Zone 1 represents areas which have less than a 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.

The site is located outside of the TAN-15 defended zone for sea and is therefore not directly protected by any tidal flood defences.

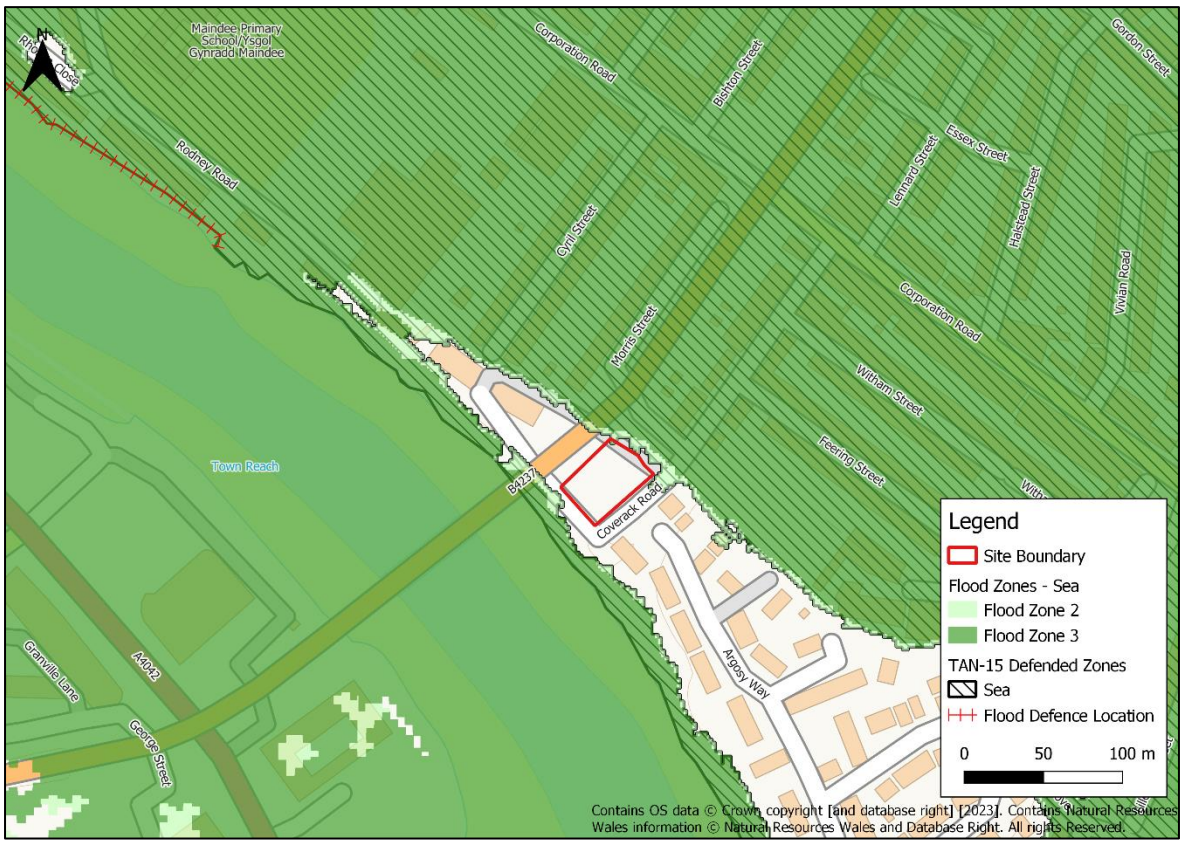


Figure 3-3 Flood Map for Planning – Sea

3.5 Local Development Plan

The Newport Local Development Plan 2011 - 2026[3] is designed to guide development within Newport up to 2026. The vision of the plan is to make Newport "a centre of regeneration that celebrates its culture and heritage, while being a focus for varied economic growth that will strengthen its contribution to the region". To achieve this vision, the plan has ten detailed objectives.

Objective 1 is the "Sustainable Use of Land". This objective plans to ensure that "development makes the most efficient use of natural resources by seeking to locate development in the most sustainable locations". Specifically, Newport City Council wants to make use of the numerous brownfield sites that exist around the city, such as this site on Coverack Road.

Objective 4 sets out plans for housing provision "to ensure there is an adequate supply of land for housing in the most sustainable locations, and to ensure that the quantity, and quality and variety of housing provision meets the needs of the population". Objective 4 aims to reuse brownfield sites to ensure sustainability. It has also provided a target to deliver approximately 10,350 new homes by 2026, to cope with the population increase of Newport.

3 http://www.newport.gov.uk/documents/Planning-Documents/LDP-2011-2026/LDP-Adopted-Plan-January-2015.pdf

3.6 Severn Estuary Shoreline Management Plan

The development site falls within the Newport, River Usk and surrounding area Theme Area of the Severn Estuary SMP (SMP) as seen in Figure 3-4.

The site lies within Management Unit NEW 4 - River Usk (East bank) at M4 crossing to Spytty Pill (north of A48 crossing). This management unit has a Hold the Line policy for the 50-100-year epoch (year 2105).

Hold the line is defined as “keeping the line of defence in approximately its current location. This may mean repairing or replacing defences”.

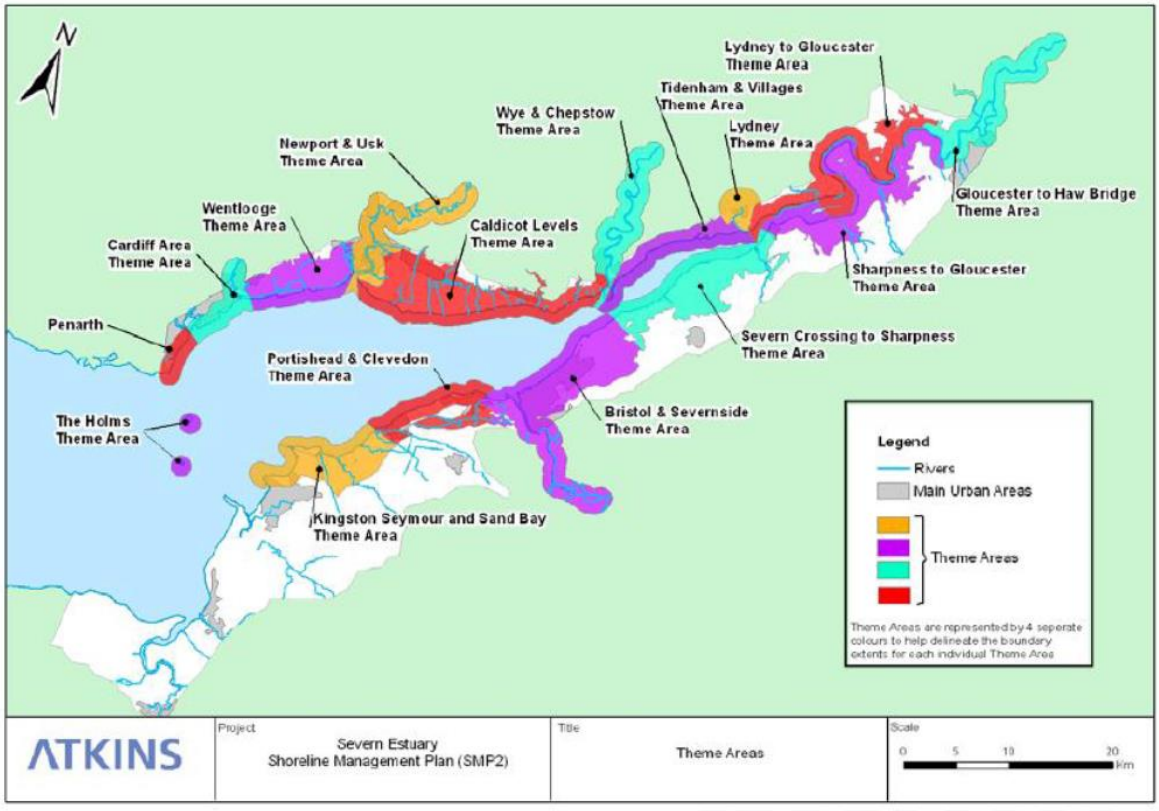


Figure 3-4 Theme Areas - Severn Estuary Shoreline Management Plan

3.7 Justification Test

As a result of the sites location within DAM Zone B and Flood Zone 1, the application of the Justification Test is not required. However, adopting a precautionary approach, this FCA demonstrates how all aspects of the acceptability criteria will be satisfied in full, as detailed in Section 6 of this report.

4 Flood Risk Assessment

This section assesses the risk to the proposed development site from all sources of flooding, based solely on a desk-based analysis of existing flood risk data.

4.1 Review of Existing Flood Risk Data

The latest available information on flood risk at the site, published by Natural Resources Wales (NRW) is summarised in Table 4-1 below.

Table 4-1 Summary of Flood Risk

Source of Flooding	Onsite Presence	Description
Flood Risk from Rivers	×	The site is at very low risk of river flooding.
Flood Risk from the Sea	×	The site is at very low risk of tidal flooding.
Flood Risk from Surface Water and Small Watercourses	×	The site is at very low risk of surface water flooding.
Flood Risk from Groundwater	×	The site is at very low risk of flooding from groundwater.
Flood Risk from Reservoirs	✓	The site is at low risk of flooding from reservoirs.
Flood Risk from Sewers	×	The site is at low risk of flooding from sewers.

4.2 Historical Flooding

NRW's map of recorded flood extents does not show any evidence of historic flooding on the site. Newport Council's Preliminary Flood Risk Assessment[4] (PFRA) and Local Flood Risk Management Strategy[5] (LFRMS) identified no records of historic flooding at the site.

4.3 Flood Risk from Rivers

NRW's Flood Risk Assessment Wales (FRAW) flood mapping shown in Figure 4-1 indicates that the site is located within an area at **very low** risk of flooding in the Flood Risk from Rivers mapping. Areas at very low risk have less than 1 in 1000 (0.1%) chance of flooding in a given year.

4 https://www.newport.gov.uk/documents/Planning-Documents/Flood-risk/Preliminary-Flood-Risk-Assessment-Report-April-2011.pdf
5 https://www.newport.gov.uk/documents/Policies/Newport-LFRMS-Report-Issue-Rev.pdf

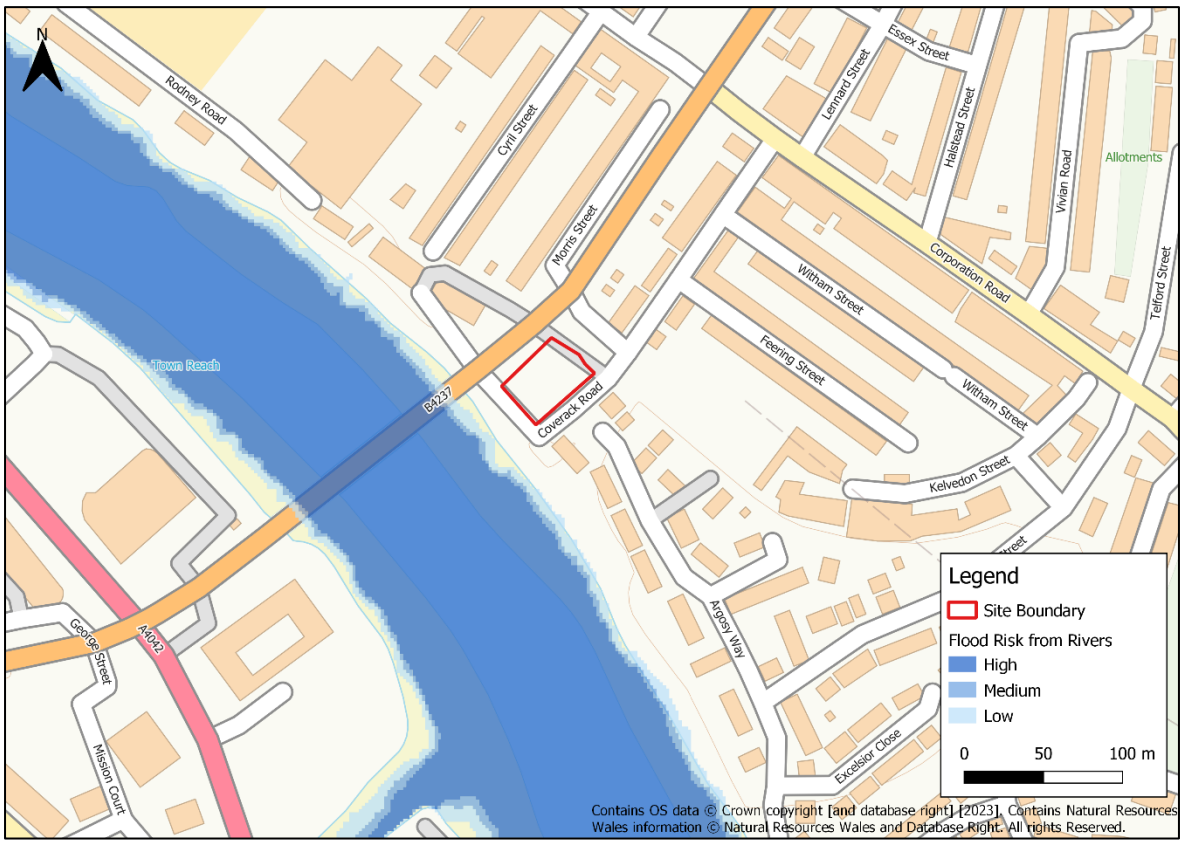


Figure 4-1 FRAW map – Risk of flooding from Rivers

4.4 Flood Risk from the Sea

Figure 4-2 highlights that the site is located within an area at **very low** risk of tidal flooding, with less than 1 in 1000 (0.1%) chance of flooding in a given year.

Areas of nearby flood risk are within areas designated as being 'areas benefiting from flood defences'.

Figure 4-2 FRAW map – Risk of flooding from the Sea

4.5 Flood Risk from Surface Water and Small Watercourses

The NRW FRAW Surface Water and Small Watercourse map shown in Figure 4-3 also highlights that the site is located outside of the mapped flood extent. The site is therefore at **very low** risk of flooding (<0.1% AEP).

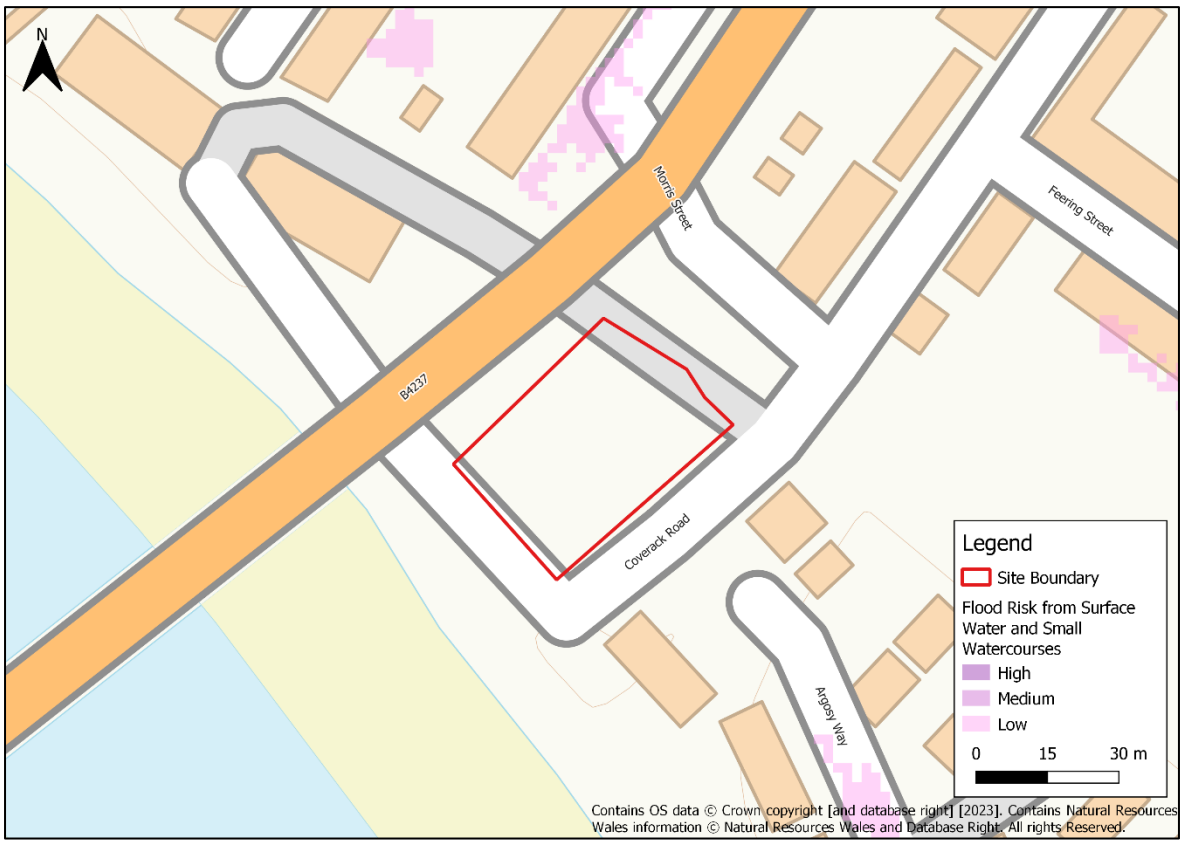


Figure 4-3 FRAW map - Risk of flooding from Surface Water and Small Watercourses

4.6 Flood Risk from Groundwater

Groundwater flooding is caused by unusually high groundwater levels. It occurs as excess water emerges at the ground surface or within manmade structures such as basements. Groundwater flooding tends to be more persistent than surface water flooding, in some cases lasting for weeks or months, and can result in damage to property. This risk of groundwater flooding depends on the nature of the geological strata underlying the site and the local topography.

Newport City Council's Local Flood Risk Management Plan (2015)[6] states that groundwater flooding is not considered to be a significant flood risk and there are very few instances of groundwater flooding in Newport. Therefore, the groundwater flood risk to the proposed development site is considered to be **very low**.

4.7 Flood Risk from Reservoirs

NRW flood maps indicate that the proposed development site is located within an area at risk of reservoir flooding, as shown in Figure 4-4. The southwestern portion of the site is at risk of flooding from Llandegfedd Reservoir, located 11km north of the site.

6 https://www.newport.gov.uk/documents/Council-and-Democracy/Consultations/Newport-Flood-Risk-Management-Plan-Report-Issue-for-Consultation.pdf

However, as a result of regular inspections covered by the 1975 Reservoir Act, it is extremely unlikely that a reservoir would fail, and due to the location of the reservoirs in relation to the site, substantial warning time would be available. Therefore, the risk of reservoir flooding is considered to be **low**.

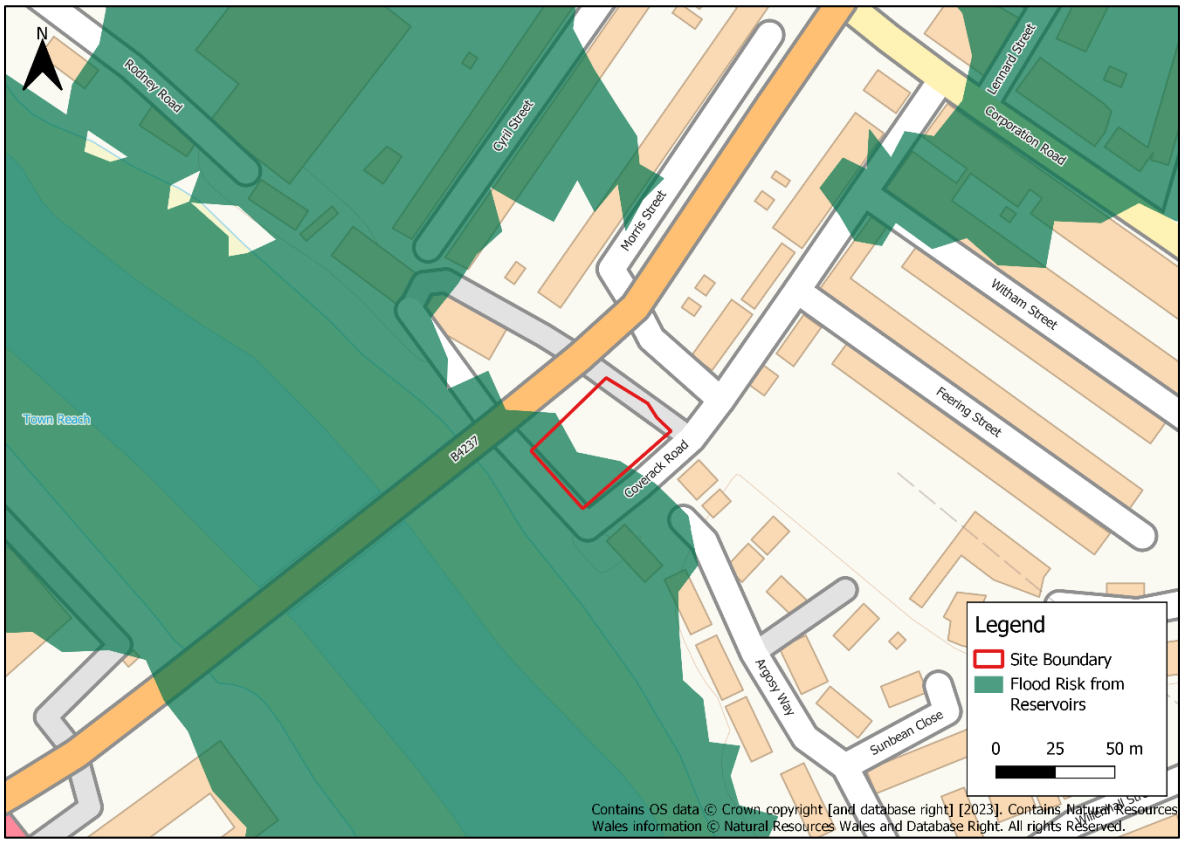


Figure 4-4 Risk of Reservoir flooding

4.8 Flood Risk from Sewers

Newport's PFRA[4] states that 'Data provided by DCWW indicates a total of 78 locations across the council area that have suffered from historical sewer flooding.' However, there is no evidence to suggest previous flooding at the development site. The report also concluded that flooding from sewers does not have significant consequences at a strategic scale, so it can be concluded that the risk of sewer flooding at the site is **low**.

5 Detailed Flood Risk Assessment

As identified in Section 4, the site is not shown to be at risk of flooding. However, to better understand the flooding potential, further assessment using results from the latest tidal flood model for Newport are discussed below.

5.1 Hydraulic Modelling Availability

The detailed assessment of tidal flood risk is based on Version 7.0 of the Newport Tidal Flood Model (June 2020). This is a 1D-2D ESTRY-TUFLOW tidal model of Newport, which JBA Consulting prepared for a successful Flood Map Challenge at that time. Further to the model updates contained in the Flood Map Challenge, the Newport Tidal model (Version 7.0) was further updated by JBA Consulting in 2022 and 2023 to include several further model improvements.

The latest JBA model of Newport was updated to include the recently completed Crindau flood defences, and the ESTRY-TUFLOW version was updated to 2020-10-AD -iSP-w64. In addition, the tidal boundary conditions were updated in line with the latest (September 2021) Welsh Government climate change guidance for Flood Consequence Assessments[7] to consider flood risk for the lifetime of development (100 years).

To represent the present-day 2023 scenario, the tidal boundary conditions were uplifted to the current year, from the CFB dataset base year of 2017, using the Higher Central allowance (70th percentile) of the UK Climate Projections (UKCIP 18) for 2100 for Representative Concentration Pathway 8.5 (RCP 8.5).

To account for the impact of sea level rise over the lifetime of the development (100 years), a further uplift was calculated for the 2123 scenario based on the Higher Central allowance (70th percentile) of the UKCP 18 for 2100, RCP 8.5 dataset. The uplift for the 23 years of additional climate change beyond 2100 was applied based on the dataset's average increase in the last five years. Table 5-1 summarises the sea level rise uplifts applied to the tidal boundary conditions and the resulting peak tide levels.

Table 5-1 Sea level rise uplifts and peak tide levels

Scenario	Sea level rise uplift (m)	Peak tide level (m AOD)	
		0.5% AEP	**0.1% AEP event**
2017 (CFB dataset base year)	N/A	8.33	8.67
2023	0.032	8.36	8.70
2123	1.062	9.39	9.73

7 https://gov.wales/sites/default/files/publications/2021-09/climate-change-allowances-and-flood-consequence-assessments_0.pdf

The Newport tidal flood model has a coarse grid size of 10m and features below 10m in size may not be fully represented. However, the 10m grid size provides a balance between representing sufficient detail of the floodplain/flow routes across the mainly rural catchment and model run times; whilst also limiting the computational size of model outputs and has been previously accepted by NRW as part of the Flood Map Challenge circa June 2020.

5.2 Tidal Flood Risk Results

5.2.1 0.5% AEP Plus Climate Change

Figure 5-1 shows that the proposed development is not at risk of flooding during the 0.5% AEP plus Climate Change event.

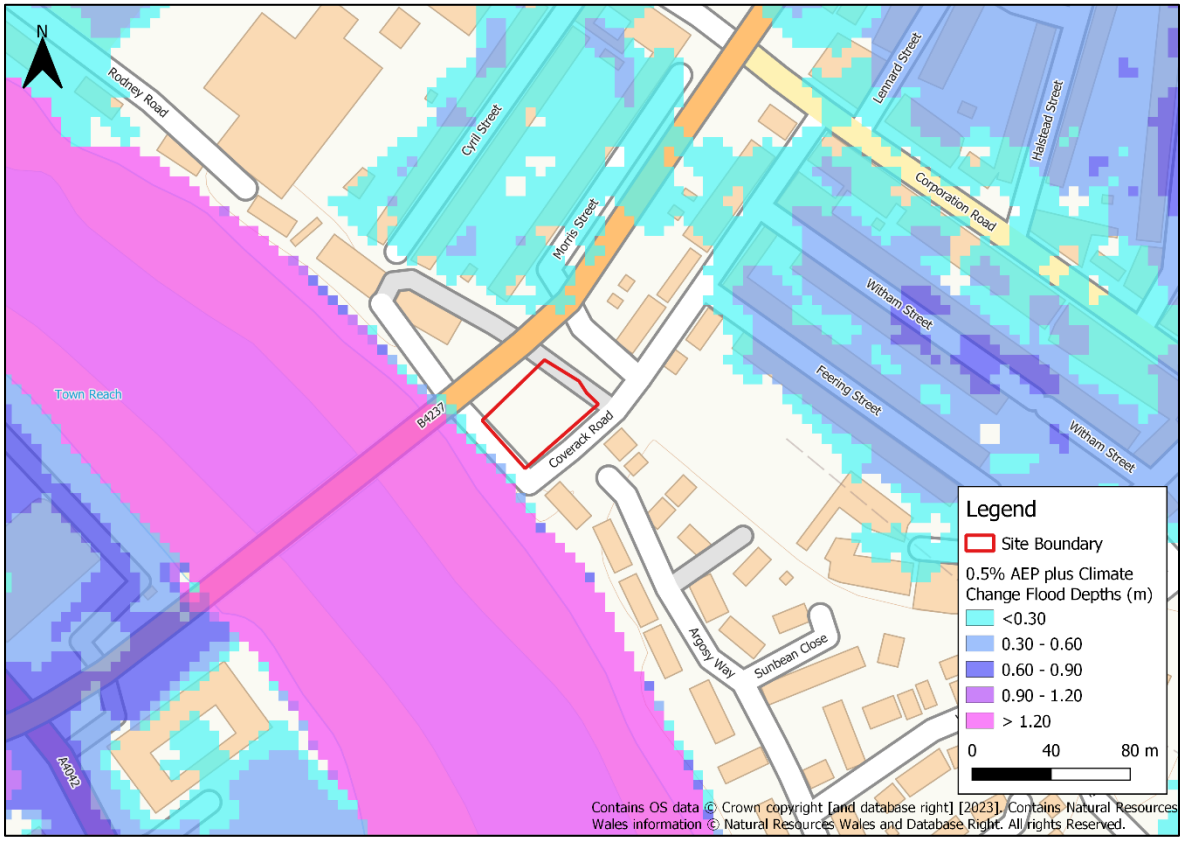


Figure 5-1 Baseline – 0.5% AEP event plus Climate Change

5.2.2 0.1% AEP plus Climate Change event

Figure 5-2 highlights that although a significant area of Newport is at risk of flooding, the proposed development site remains flood free during the 0.1% AEP plus Climate Change event.

Water levels to the southwest of the site are shown to be 9.8mAOD, and 8.46mAOD to the northeast, with the current site level approximately 10.2mAOD. It is therefore evident that the site levels are higher than the area at risk of flooding in the 0.1% AEP plus climate

change event and there is no need to consider flood risk further as development meets the requirements set out in TAN-15.

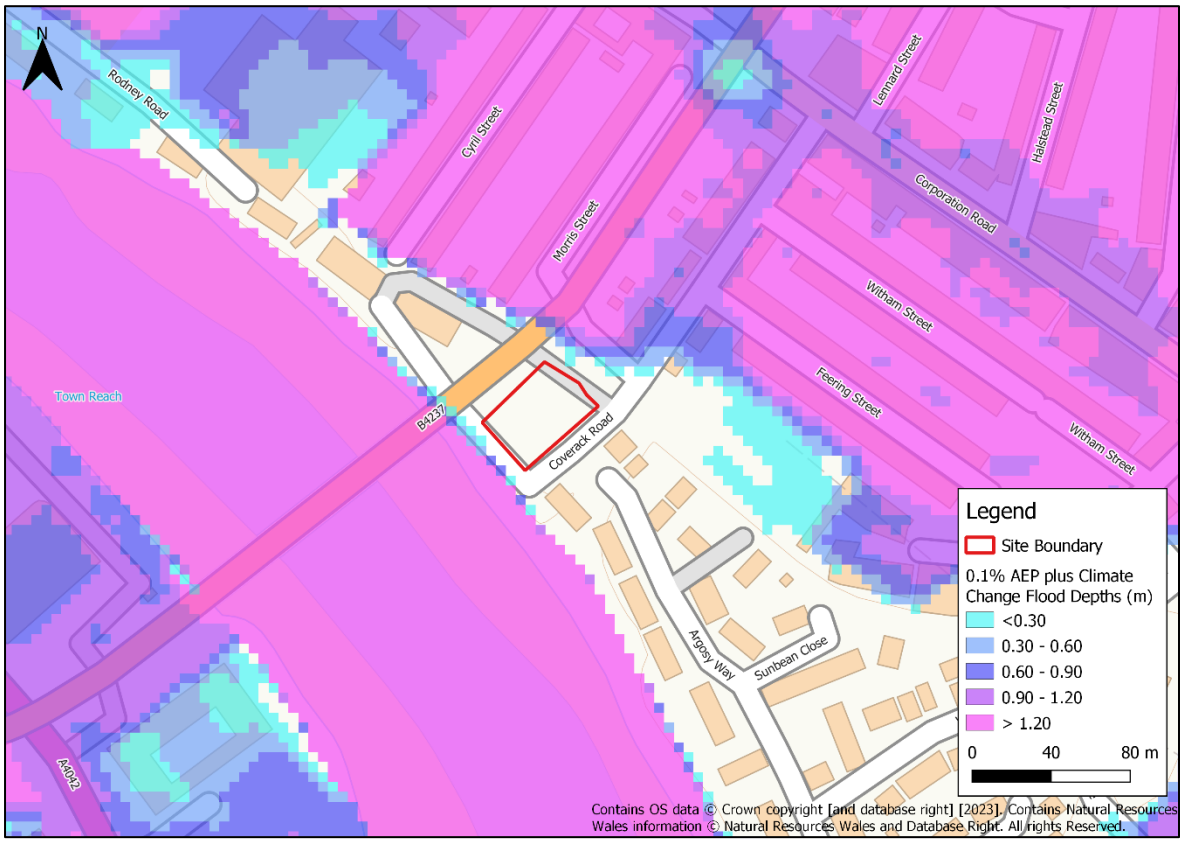


Figure 5-2 Baseline – 0.1% AEP event plus Climate Change

5.3 Access and Egress

Access and egress to and from the proposed development site may be restricted due to the significant flood depths present across Newport in both the 0.5% AEP plus climate change and 0.1% AEP plus climate change scenario, as shown in Figure 5-3 and Figure 5-4.

Access to dry land will be available at the site but access will be restricted due to the scale of flooding across Newport, assuming flood defences are not improved in the future. It is therefore advisable that residents evacuate the site in advance of flooding or make preparations to shelter in place.

It is recommended that Newport City Homes and residents sign up for NRW flood warnings.

Newport City Homes should prepare and share an emergency flood plan for the site, covering (at a minimum) adequate flood warning, evacuation and access/egress routes in the event of flooding for the lifetime of the development. This should encourage residents to evacuate site prior to a flood event. If residents were unable or unwilling to evacuate the building, the proposed development will provide safe refuge to residents, given that the site is not at risk of flooding.

Flooding is likely to be short lived as tidal water will begin to recede rapidly after the peak of high tide. Further guidance on mitigating the risk of flooding to the proposed development is provided in Section 6 below.

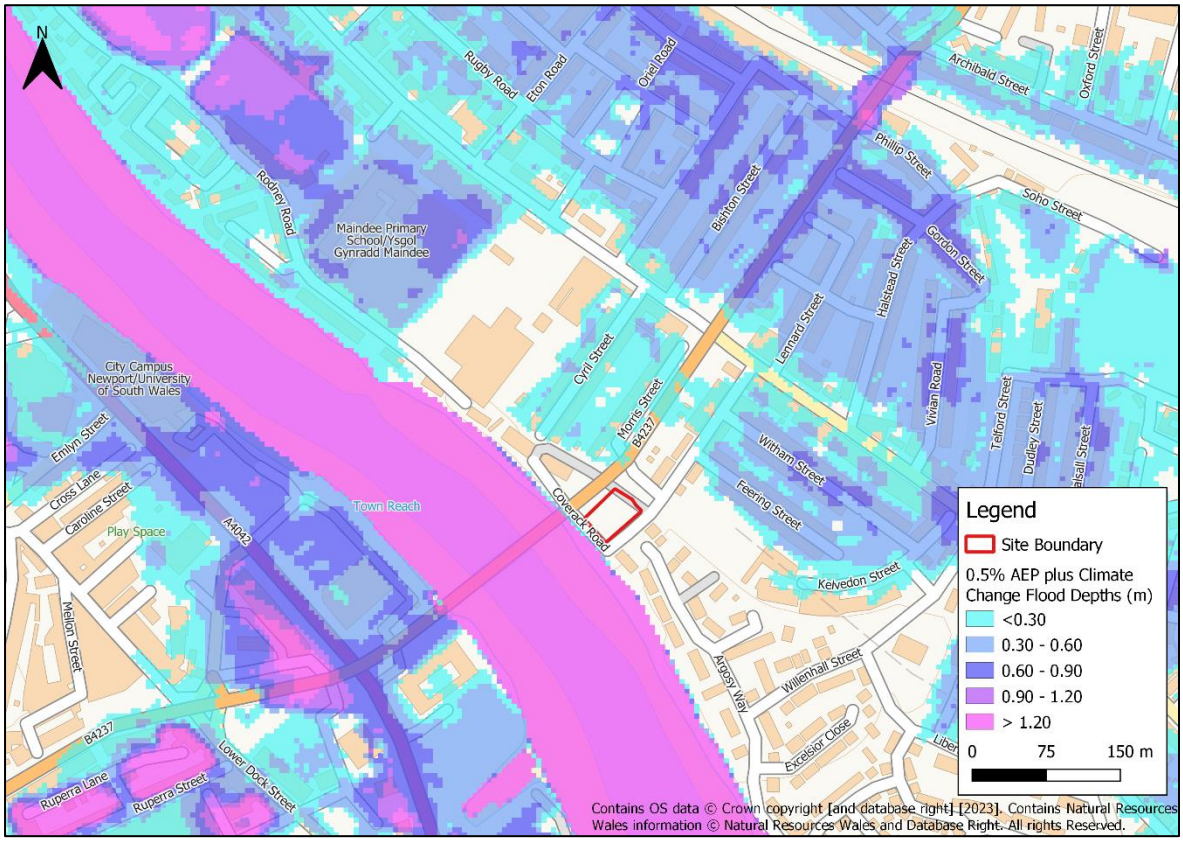


Figure 5-3 Baseline – 0.5% AEP event plus Climate Change Extent

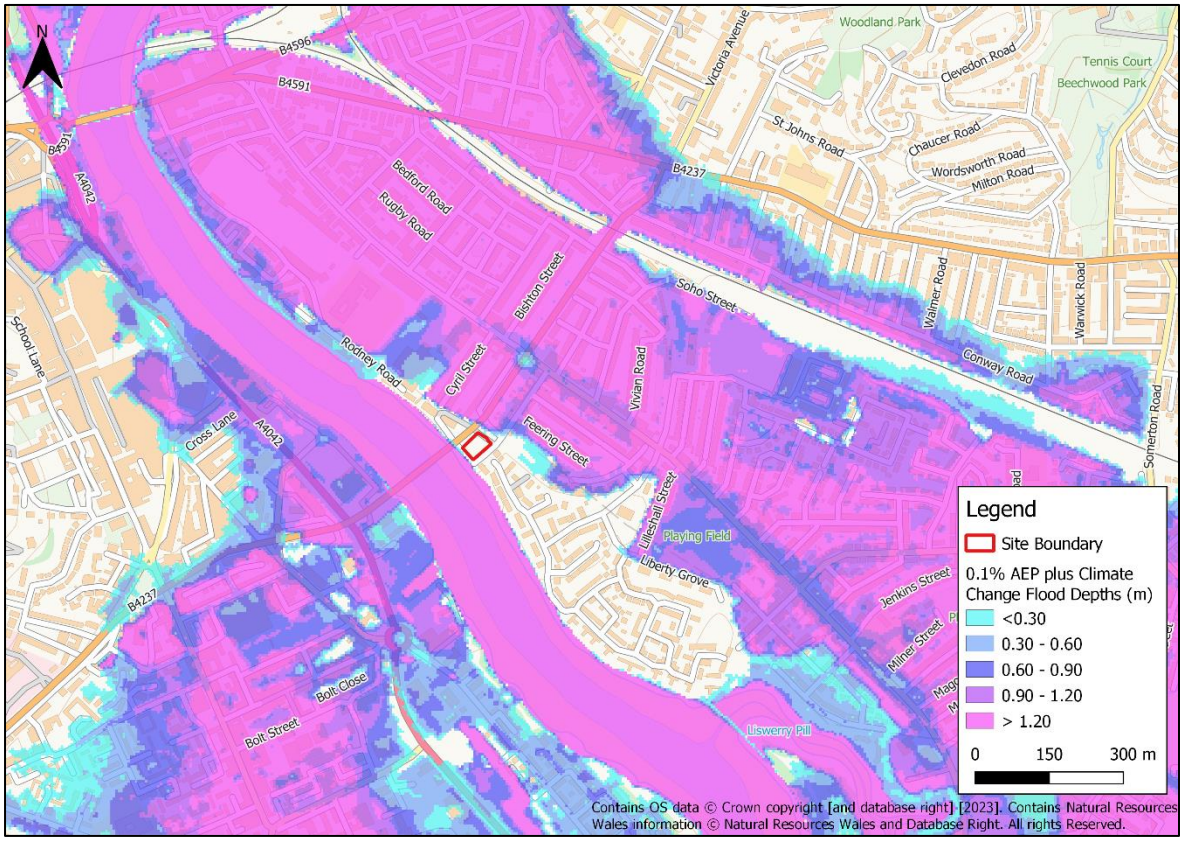


Figure 5-4 Baseline – 0.1% AEP event plus Climate Change Extent

6 Assessment of Acceptability Criteria

Table 6-1 assesses the proposed development against the acceptability requirements required by TAN-15.

Table 6-1 Assessment of accessibility criteria

TAN 15 Justification Criteria	Comments	Achieved
Developer is required to demonstrate that the site is designed to be flood free for the lifetime [Ref: TAN-15 A1.5] of development for a 1 in 100 (1%) chance (fluvial) and 1 in 200 (0.5%) chance (tidal) flood event including an allowance for climate change in accordance with TAN-15 table A1.14.	Fluvial: The proposed development site is located outside of the fluvial flooding extent and is therefore flood free. Tidal: The proposed development site is located outside of the 0.5% AEP plus Climate Change tidal flooding extent and is therefore flood free.	Yes
The development should be designed so that in an extreme (1 in 1000 chance) event there would be less than 600mm of water on access roads and within the property.	Fluvial: The proposed development site is located outside of the fluvial flooding extent and is therefore flood free. Tidal: The proposed development site is located outside of the 0.1% AEP plus Climate Change tidal flooding extent and is therefore flood free.	Yes
No flooding elsewhere.	The site is not at risk of flooding. Therefore, there is no potential for the proposed development to impact upon flooding elsewhere.	Yes
Flood defences must be shown by the developer to be structurally adequate particularly under extreme overtopping conditions (i.e. that flood with a 1 in 1000 chance of occurring in any given year).	The site is not directly protected by the existing NRW flood defences along the River Usk. However, as per the current FRM policy of 'Hold the Line' set out in the Severn Estuary Shoreline Management Plan, future tidal flood risk to the development site will be managed in the same manner as existing properties and businesses in the area.	Yes
The developer must ensure that future occupiers of development are aware of the flooding risks and consequences.	The developer shall provide purchasers with information on the flood risk in the form of this report.	Yes

TAN 15 Justification Criteria	Comments	Achieved
Effective flood warnings are provided at the site.	The site is covered by the 'Usk Estuary at Maindee, North Liswerry and Spytty Pill' flood warning area and the 'Usk Estuary' flood alert area. Substantial flood warning lead times of several days are typical for tidal storm surges.	Yes
Escape/evacuation routes are shown by the developer to be operational under all conditions.	Considerable flood warning lead time (>24hrs) should provide plenty of time to evacuate the site safely. If residents were unable or unwilling to evacuate the building, the proposed development will provide safe refuge to residents, given that the site is not at risk of flooding.	Yes
The development is designed by the developer to allow the occupier of the facility for rapid movement of goods/possessions to areas away from flood waters.	Not applicable. The site is not at risk of flooding therefore goods and possessions should not need to be moved away from any areas at risk of flooding.	Yes
Development is designed to minimise structural damage during a flooding event and is flood proofed to enable it to be returned to its prime use quickly in the aftermath of the flood.	Not applicable. The building is not at risk of flooding.	Yes

7 Conclusions and Recommendations

JBA Consulting (JBA) were commissioned by Newport City Homes to prepare a Flood Consequence Assessment (FCA) to support a planning application for a residential development on Coverack Road, Newport. This development comprises Phase 2 of the Galliford's Yard development site.

The 0.16ha site was previously used for light industrial use but has been vacant for a number of years. The site is therefore classed as previously developed land (brownfield). Due to the brownfield and hardstanding existing nature of the site, natural infiltration is unlikely to contribute to the existing drainage and the site is likely to be characterised by made-ground up to significant depths.

Natural Resources Wales (NRW) Open Source 1m Light Detection and Ranging (LiDAR) data, highlights that elevations on the site remain fairly level at approximately 10.2mAOD.

The site lies on the left bank of the River Usk. The River Usk is tidally influenced, with the coast located 5.5km to the south. No watercourses cross the proposed development site.

The entire site is located within DAM Zone B, which is described as areas of the floodplain known to have flooded in the past evidenced by sedimentary deposits. Classification Zone B is 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.

The site is not shown to be at risk of flooding in the tidal 0.5% and 0.1% AEP plus Climate Change events according to JBA's latest hydraulic modelling of Newport. However, many nearby areas are at tidal flood risk, and this has the potential to disrupt access and egress.

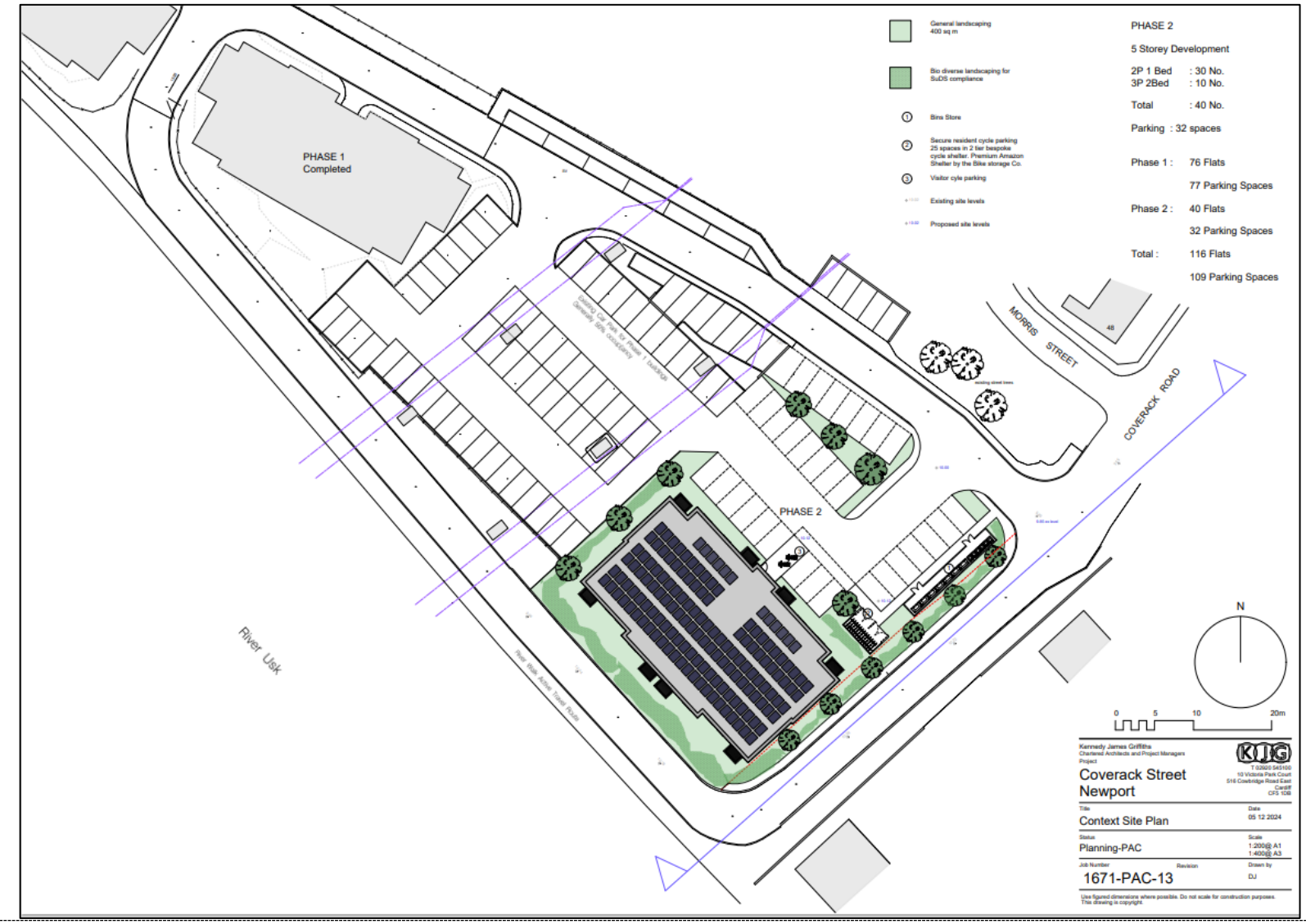
The site is at low risk of sewer and reservoir flooding and is at very low risk of fluvial, tidal, surface water and groundwater flooding.

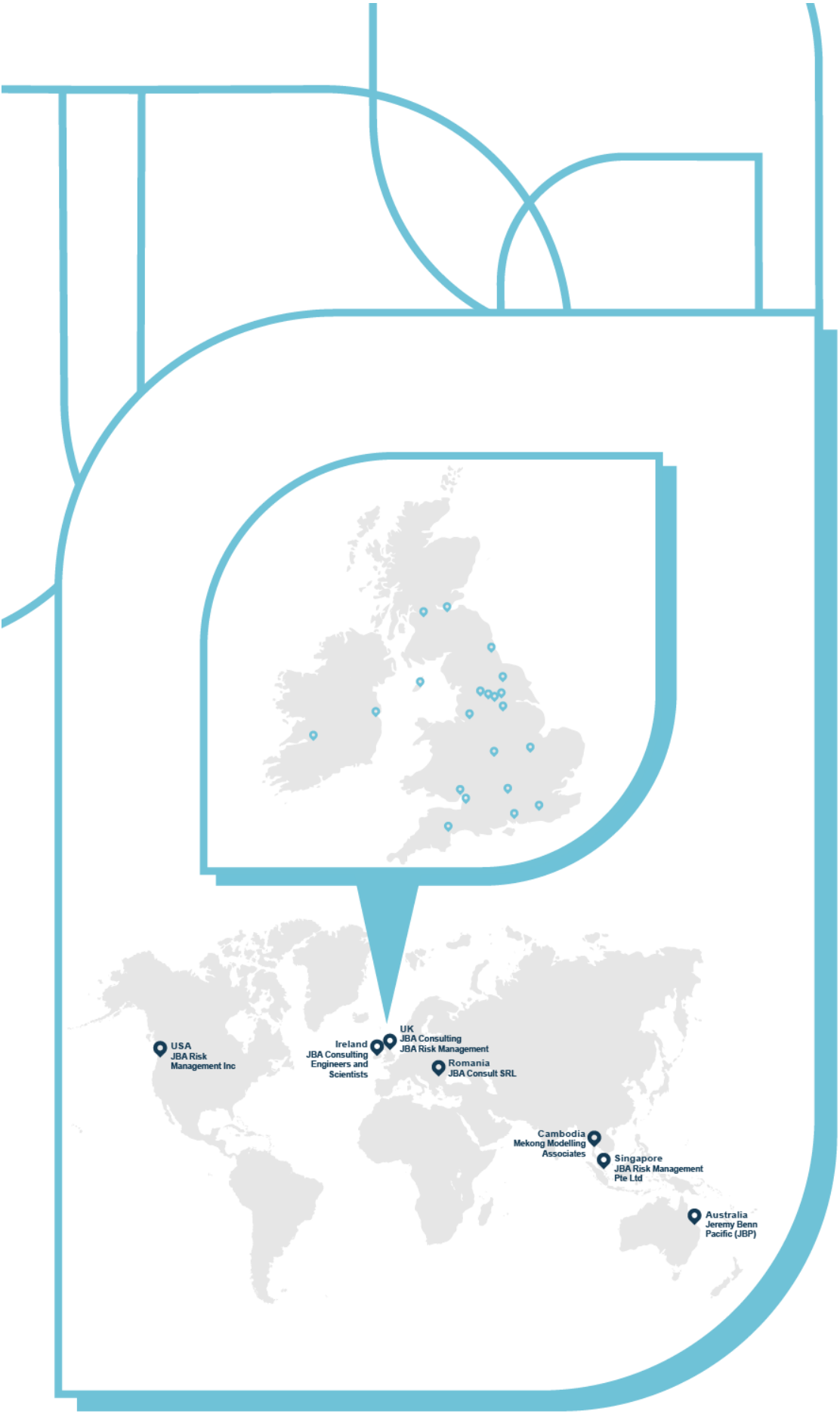
Considering the risk of tidal flooding near to the site, it is recommended that a Flood Plan is prepared for future occupants of the building. At a minimum, the flood emergency plan should cover adequate flood warning, evacuation and access/egress routes in the event of flooding for the lifetime of the development.

As a result of the sites location with DAM Zone B the Justification Test is not appliable. However, adopting a precautionary approach, all aspects of the Acceptability Criteria set out in TAN-15 have been assessed and shown to be satisfied. Consequently, we conclude that on the grounds of flood risk, the proposed development meets the requirements set out in TAN-15 and the aims of Planning Policy Wales.

Appendix

A Proposed Development Plan





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