

FLOOD RISK AND DRAINAGE

JBA Project Code	2022s0514
Contract	Project Dragon (Phoenix Wharf, Port Talbot)
Client	LanzaTech UK Limited
Date	October 2022
Author	Faye Tomalin BSc (Hons) MSc C.WEM MCIWEM
Reviewer	George Baker BEng AIEMA CEnv IEng MCIWEM C.WEM
Subject	Candidate Site Supporting Statement – Flood Risk and SuDS

1 Introduction

JBA Consulting have been commissioned to prepare a high level flood risk and SuDS statement in support of a candidate site submission for proposed development at Phoenix Wharf, for inclusion within the upcoming Local Development Plan (LDP) for Neath Port Talbot.

2 Planning Policy

2.1 Planning context

Development and flood risk policy in Wales is set out in Technical Advice Note 15: Development and Flood Risk (TAN15). TAN15 was published in 2004 and was due to be replaced by an updated TAN15 on the 1st December 2021. The new TAN15¹ was accompanied by a new Flood Map for Planning. However, on the 24th November 2021 Welsh Government suspended the implementation of the new TAN15 until 1st June 2023.

From the 1st June 2023 any planning application determined after this date will be determined against the new TAN15 criteria. The new TAN15 is currently only a material consideration for strategic planning purposes, such as in the proposed allocation of this site.

Any further reference to TAN15 in this report refers to TAN15 which will be adopted on 1 June 2023.

TAN15 reflects the core principles of the National Strategy for Flood and Coastal Erosion Risk Management in Wales² to adopt a risk-based approach in respect of new development in areas at risk of flooding and coastal erosion. TAN15 comprises technical guidance related to development planning and flood risk and provides a framework within which the flood risks arising from rivers, the sea and surface water, and the risk of coastal erosion can be assessed.

Its initial requirement is to identify the flood zones and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions. An indicative sequence to negotiating the various elements of TAN15 is provided below in Figure 2-1.

¹ Technical Advice Note 15: Development, flooding and coastal erosion. Welsh Government (December 2021)

² National Strategy for Flood and Coastal Erosion Risk Management in Wales. Welsh Government (October 2020)
<https://gov.wales/national-strategy-flood-and-coastal-erosion-risk-management-wales>

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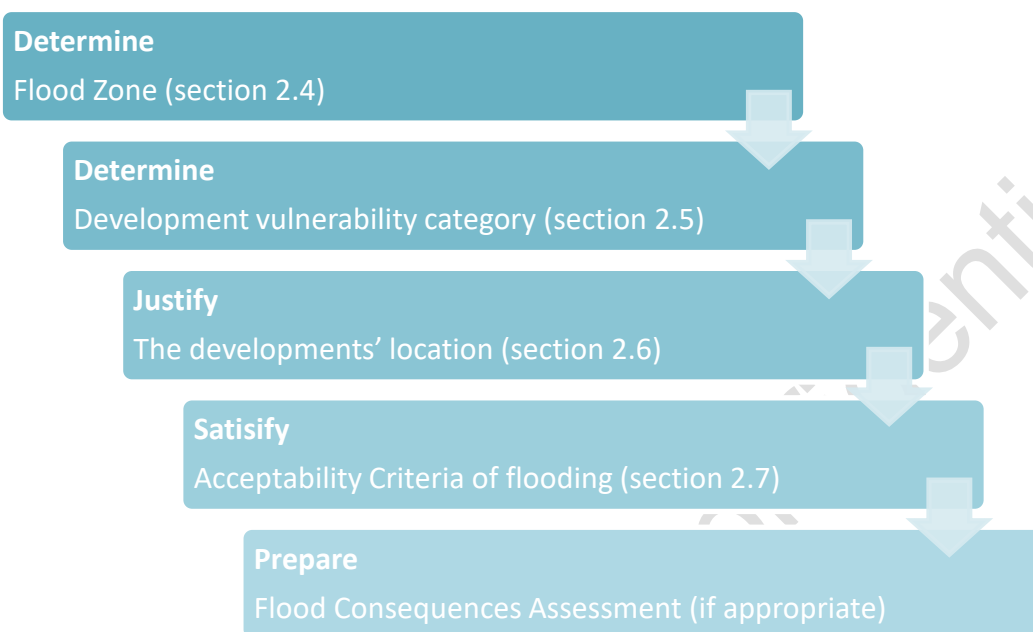


Figure 2-1: Navigating TAN15 requirements

2.2 Vulnerability Classification

The proposals are for a mixed-use residential development. All residential elements are classified as highly vulnerable development. Other non-residential development shall be classified as Less Vulnerable Development, with areas of public open space classified as Water Compatible Development.

2.3 Flood Map for Planning

Table 1 summarises how the Flood Map for Planning (FMfP) ³ and TAN15 define flood zones based on the likelihood of flooding.

The FMfP flood extents are based on the central estimates of climate change, assuming a 100-year lifetime of development.

Table 1: TAN15 Definition of Flood Map for Planning flood zones

Zone	Flooding from Rivers	Flooding from the Sea	Flooding from Surface Water and Small Watercourses
1	Less than 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year		
2	Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of	Less than 1 in 200 (0.5%) but greater than 1 in 1000	Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%)

³ <https://flood-map-for-planning.naturalresources.wales>

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	flooding in a given year, including climate change	(0.1%) chance of flooding in a given year, including climate change	chance of flooding in a given year, including climate change
3	A greater than 1 in 100 (1%) chance of flooding in a given year, including climate change	A greater than 1 in 200 (0.5%) chance of flooding in a given year, including climate change	A greater than 1 in 100 (1%) chance of flooding in a given year, including climate change
TAN15 Defended zone	Areas where flood risk management infrastructure provides a minimum standard of protection against flooding from rivers of 1:100 (plus climate change and freeboard)	Areas where flood risk management infrastructure provides a minimum standard of protection against flooding from the sea of 1:200 (plus climate change and freeboard)	Not applicable

FMfP - Flood Risk from Rivers

As shown in Figure 2, a small part of the proposed development site is located in Flood Zone 2 (between a 0.1% and 1% chance of flooding in any given year) of the Flood Map for Planning for Rivers. The rest of the proposed development site is located in Flood Zone 1 (less than a 0.1% chance of flooding in any given year).

NRW have advised that any site located within Flood Zone 2 will require an assessment of flood risk.

An aerial photograph of a coastal area. A large green forested area is outlined by a red polygon representing the site boundary. To the north of the boundary are industrial buildings and structures. To the east is a body of water. The map includes a legend in the bottom right corner with the following items:

- Site Boundary (red outline)
- Flood Map for Planning - Rivers
 - Flood Zone 2 (light blue shading)
 - Flood Zone 3 (dark blue shading)

A scale bar at the bottom right indicates distances of 0, 50, and 100 meters. At the very bottom of the page, there is a small text block containing copyright information and sources.

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FMfP - Flood Risk from Sea

NRW have advised that any site located within Flood Zones 2 and 3 will require an assessment of flood risk.

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Figure 3 FMfP - Flood Risk from Sea

3 Flood Risk Assessment

3.1 Current Understanding of Flood Risk

In order to comprehensively assess the risk of flooding to the proposed development site, flood modelling has been undertaken. The detailed fluvial and tidal flood risk model consisted of the 1D-2D linked ESTRY-TUFLOW Model of Port Talbot, originally developed by JBA Consulting in August 2017. This detailed model has since been updated for another location close to the proposed development (planning reference P2020 0303).

Updates to the modelling for this project include:

- Updating the building representation to be based solely on the OS Mastermap layer with a 90% blockage factor applied.
- Run the model with the latest version of TUFLOW.
- Update the tidal boundary conditions to be uplifted to 2021 to represent present-day conditions and consider the impact of the 2096 climate change epoch.

In accordance with Welsh Government Guidance on Climate Change Allowances for Planning Purposes the 75-year cumulative sea level rise needs to be considered for commercial/industrial land uses. To account for the impact of sea level rise over the lifetime of the development a further uplift was calculated for the 2096 scenario based on the Higher Central allowance (70th percentile) of the UKCP 18 for 2100, RCP 8.5 dataset.

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Fluvial Flood Risk

The baseline model shows that the proposed development site is predicted to be flood free in the 1% AEP plus climate change fluvial event.

During the 0.1% plus climate change fluvial event, the proposed development site is predicted to flood to a maximum depth of 295mm. The predicted flood level is 7.41 mAOOD.

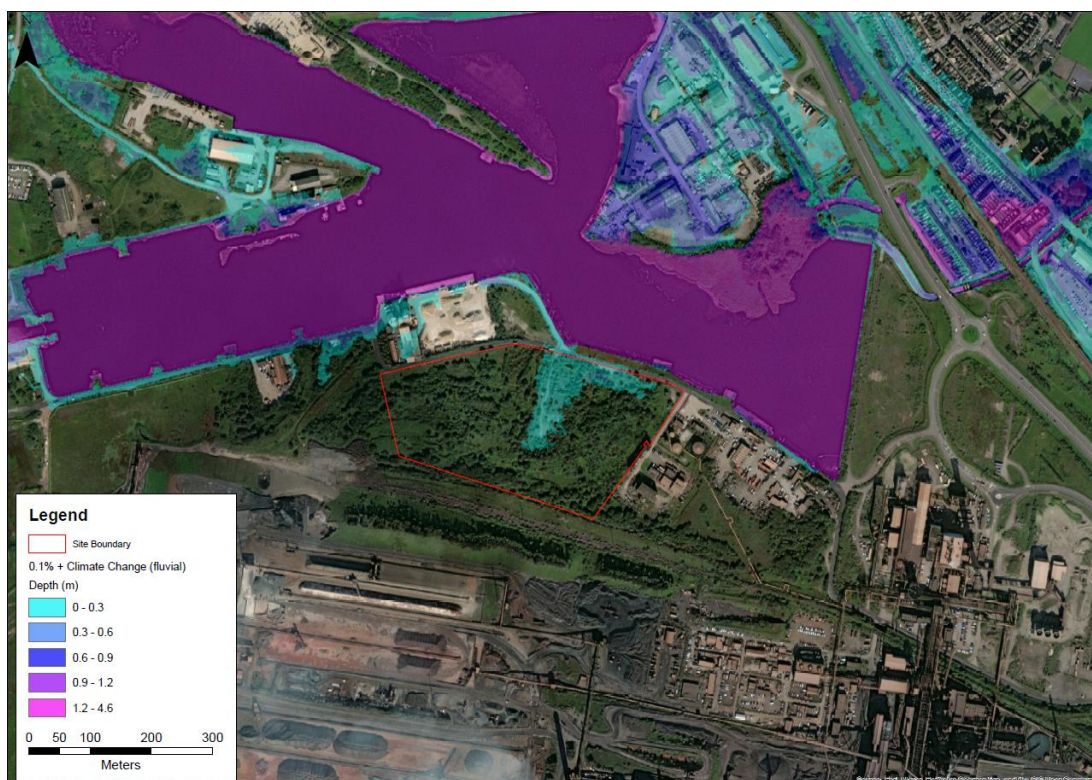


Figure 4 0.1% + CC Fluvial Event

Tidal Flood Risk

The tidal model shows that the proposed development site is predicted to be flood free in the 0.5% AEP event with an allowance for climate change.

In the 0.1% AEP event with an allowance for climate change, a small area of the northern boundary is predicted to flood to depths of up to 230mm, as shown in Figure 4. The predicted water level is 7.3mAOOD.

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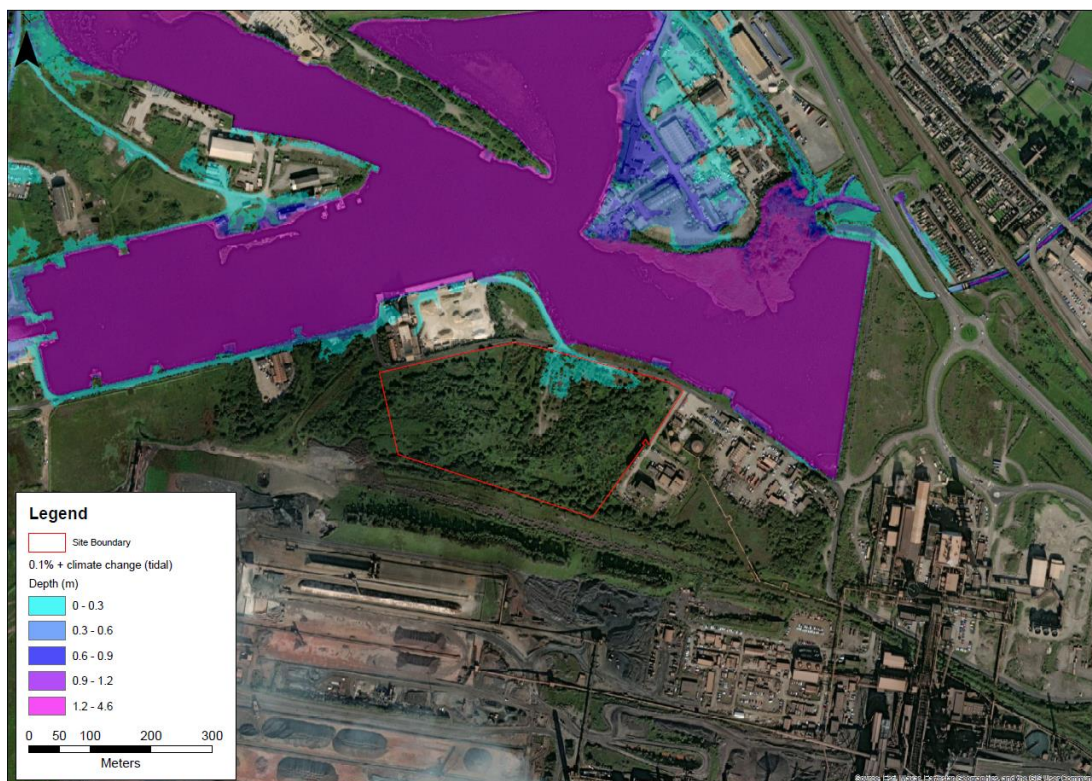


Figure 5 0.1% AEP + CC Tidal Event

3.2 Proposed Mitigation

As a result of the predicted flood depths across the site in both the 0.1% AEP plus climate change events for fluvial and tidal flood risk, modest ground raising to a minimum ground level of 7.5mAOD (where ground levels do not already exceed this) across the development site is proposed. This is summarised further in Table 1.

As a result of ground raising, the site is predicted to be flood free in all design events, therefore complying with the requirements TAN-15.

Table 2 Summary of Predicted Flood Level

Design Event	Flood Level (mAOD)	Proposed Minimum Ground Level (mAOD)	Predicted Flood Depth
0.1% + CC Fluvial	7.41	7.5	Flood Free
0.1% + CC Tidal	7.3		Flood Free

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4 Surface Water Management Approach

4.1 Sustainable drainage systems

Sustainable Drainage Systems (SuDS) aim to mimic the natural processes of Greenfield surface water drainage by allowing water to flow along natural flow routes and also aims to reduce the runoff rates and volumes during storm events, whilst providing water treatment benefits. SuDS also have the advantage of providing Blue and Green Infrastructure and ecology and recreational benefits when designed and maintained properly.

4.2 Design criteria

The following national guidance documents and design standards should be considered when developing the conceptual surface water drainage strategy:

- C753 The SuDS Manual (Ciria, 2015)
- Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems (Welsh Government, 2018)
- Planning Policy Wales – Edition 11, February 2021
- The Building Regulations 2010 Part H: Drainage and Waste Disposal
- Sewers for Adoption 7th Edition

Neath Port Talbot Council does not have any specific guidance related to SuDS. Should guidance be developed during the outline or detailed drainage design this should be consulted.

4.3 Statutory Standards for SuDS in Wales

Schedule 3 of the Flood and Water Management Act was enacted in Wales in January 2019. Consequently, all new developments in urban or rural settings of over 100m² are required to meet the Statutory Standard for SuDS in Wales, leading to the requirement for all new developments to incorporate the four pillars of SuDS design, shown in Figure 4-1. Any new development of over 100m² requires approval before construction can commence from the SuDS Approval Body (SAB), a function performed by the Lead Local Flood Authority (LLFA) within the Neath Port Talbot Council.

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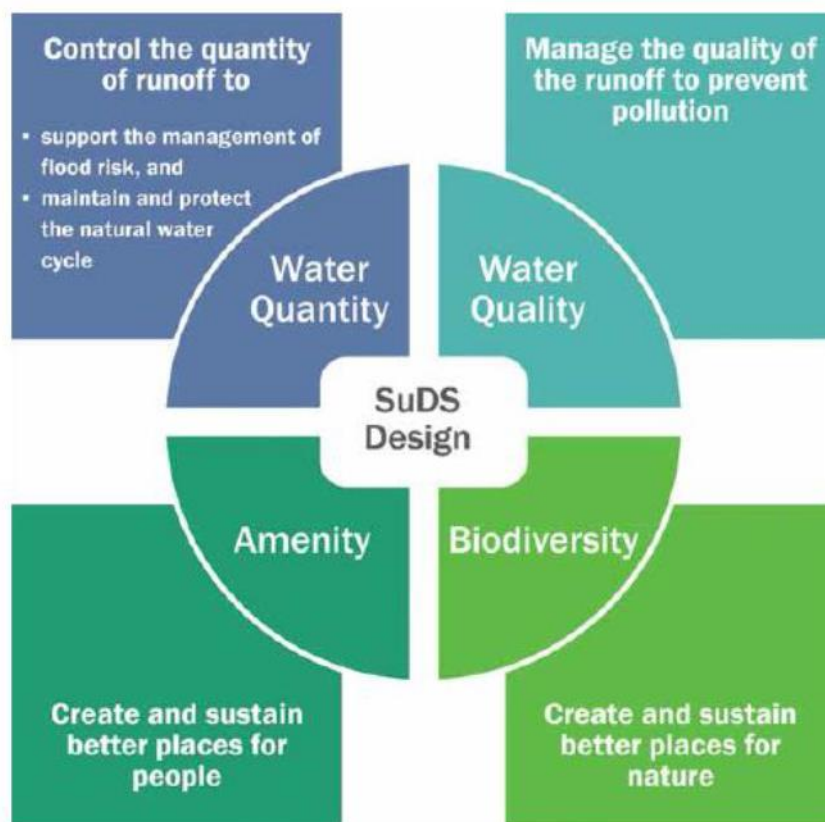


Figure 4-1 Four pillars of SuDS Design (CIRIA, 2015)

The statutory standards are as follows:

- S1 – surface water runoff destination
- S2 – Surface water runoff hydraulic control
- S3 – Water quality
- S4 – Amenity
- S5 – Biodiversity
- S6 – Design of drainage for Construction, Operation, and Maintenance and Structural Integrity

There are two types of standards. Standard S1 is a Hierarchy Standard while S2 to S6 are Fixed Standards. The Hierarchy Standard gives criteria for prioritising the choice of runoff destination, comprising 5 levels with the most preferred level represented by Level 1. Movement from Level 1 to lower levels is determined by demonstration that the exception criteria apply.

Fixed Standards give design standards which state the minimum design criteria that all SuDS should satisfy and standards which state how SuDS should be built, maintained and operated. Fixed Standards do not have exception criteria and prioritised levels. They specify all the criteria that need to be met in order to show compliance to the Standards.

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SuDS shall therefore be incorporated into development design with opportunities and constraints for SuDS feeding into the masterplanning process for the proposed development site.

5 Conclusion

- JBA Consulting have been commissioned to prepare a high level flood risk and SuDS statement in support of a candidate site submission for proposed development at Phoenix Wharf.
- The proposed development site is partially located within Flood Zone 2 of the Flood Map for Planning – Rivers. This equates to between a 0.1% and 1% chance of fluvial flooding in any given year.
- The proposed development site is located in Flood Zone 2 (between a 0.1% and 1% chance of flooding in any given year) and Flood Zone 3 (0.5% or greater chance of flooding in any given year) of the Flood Map for Planning for Sea.
- In order to comprehensively assess the risk of flooding to the proposed development site, a detailed fluvial and tidal flood risk model consisting of the 1D-2D linked ESTRY-TUFLOW Model of Port Talbot, has been updated for use in this study.
- Modelling demonstrates that the proposed development site is predicted to flood to shallow depths in both the 0.1% + CC fluvial event, and the 0.1% + CC tidal events. A flood level of 7.41mAOD and 7.3mAOD are predicted, respectively.
- It is therefore proposed to partially raise the site to a minimum ground level of 7.5mAOD, resulting in the proposed development site being flood free in all design events. This satisfies the requirements of TAN-15.
- The risk of surface water and small watercourse flooding should be easily manageable within the masterplanning process and through the use of SuDS features.