Celsa Steel Flood Consequence Assessment

June 2022

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Revision History

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May 2022 Version 1	DRAFT	Mark Tuckey
May 2022 Version 2	Updated Site Description	Mark Tuckey
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Contract

This report describes work commissioned by Mark Tuckey on behalf of CALM Recycling Solutions Ltd, by an email dated 12th April 2022. Hannah Bard of JBA Consulting carried out this work.

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Purpose

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1 Introduction

JBA Consulting were commissioned to prepare a Flood Consequence Assessment (FCA) to support a planning application to install a shredder plant and associated works to the existing Celsa Steel recycling site, Cardiff. This FCA demonstrates the suitability of the proposed development and describes the flood mitigation measures recommended to manage flooding at the site.

1.1 FCA requirements

This FCA follows Welsh Government guidance on development and flood risk set out in the Technical Advice Note 15: Development and Flood Risk (TAN15). 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 proposed site is part of the Celsa Steel site on Rover Way, Cardiff, as shown Figure 2-1. The site is bounded to the west by Rover Way, Tide Fields Road to the south and the scrub land to the east. The site is currently used as a scrap metal stockpiling and processing area within the wider Celsa Steel site.

The proposed development site is situated approximately 250m west of the Severn Estuary.

Table 2-1 summarises the key characteristics of the site.

Table 2-1: Site Summary

Site name	Celsa Steel
Site area	3.95ha
Existing land use	Scrap metal stockpiling and processing
Proposed land use	Scrap metal stockpiling and processing (reconfigured)
OS NGR	ST 21363 76181
Local Planning Authorities	Cardiff City Council
Lead Local Flood Authority	Cardiff City Council

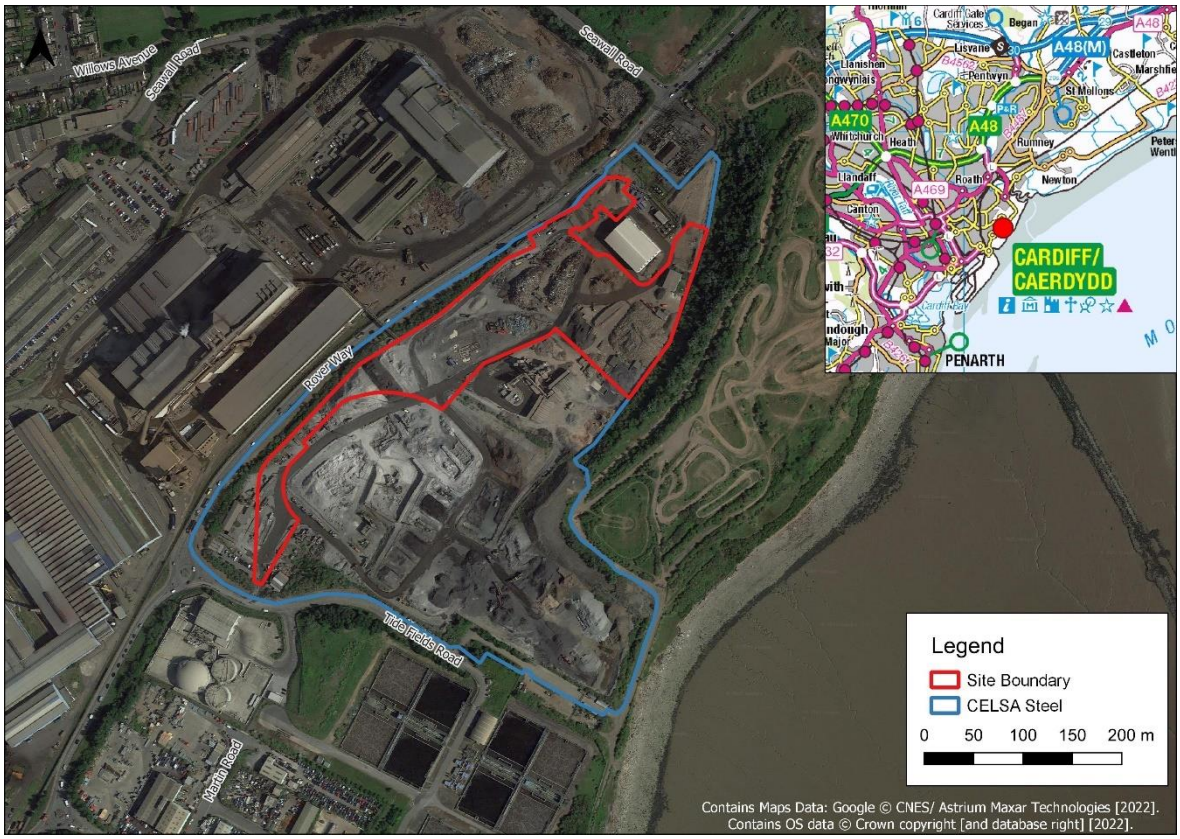


Figure 2-1 Proposed development site

2.2 Site topography

Natural Resources Wales (NRW) Open Source 1m Light Detection and Ranging (LiDAR) data[1] of the site and immediate surrounds is shown in Figure 2-2. The LiDAR data shows the site is relatively flat (8.9mAOD to 9.2mAOD) with some areas of higher ground (16.6mAOD) associated with stockpiles of material.

A detailed topographic survey has been undertaken by John Vincent Surveys Ltd in March 2022, and is contained in Appendix A. The topographic survey shows the lowest site areas are found to the east of the site: 8.49mAOD at the northeast boundary, 8.72mAOD at the hardstanding surrounding the buildings and 8.30mAOD at the southeast boundary.

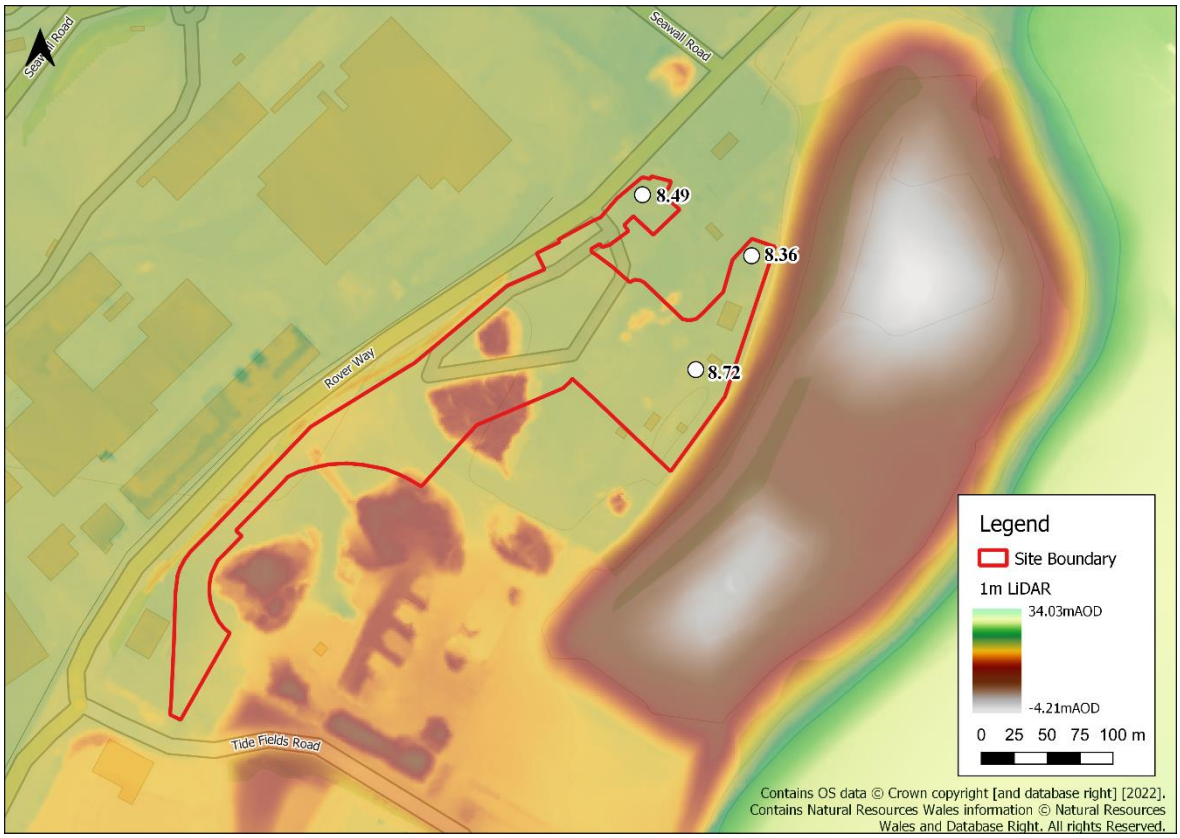


Figure 2-2: LiDAR Topographic data from NRW (1m resolution)

2.3 Soils and geology

The geology of the site has been assessed using the BGS Geology of Britain Viewer[2]. The bedrock geology is shown to be Merica Mudstone Formation comprised of siltstone, mudstone and sandstone. Superficial geology at the site is comprised of clay, silt and sand forming tidal flat deposits.

The soils on site have been assessed on the Cranfield University Soilscapes Viewer[3] and are shown to be loamy and clayey floodplain soils of coastal flats with naturally high groundwater. In practice the site is likely to be underlain by significant deposits of made ground.

2.4 Proposed development

The proposed development includes the installation a shredder plant and machinery in the area southeast of the existing Haith building (Haith plant operations area as annotated in Appendix B) to enable a reliable stock of higher quality scrap metal. Associated works include

[1] LLE Geoportal for Wales: http://lle.gov.wales/catalogue/item/LidarCompositeDataset/?lang=en
[2] Geology of Britain Viewer. https://bgs.ac.ul/map-viewers/geology-of-britain-viewer/
[3] Cranfield Soilscapes Viewer. https://landis.org.uk/soilscapes/

areas of hardstanding, designated areas in the centre of the site for stockpiling the processed and unprocessed metal, a shear machine in the eastern part of the site, a new substation along the northern boundary and a drainage infiltration scheme.

To account for increased employment, an amenity building, and 30 car parking spaces will be provided in the northern corner of the site, near the existing access from Rover Way. Vehicular access will be primarily from the existing access at Tide Fields Road. A detailed plan of the proposed shredder plant and associated works can be found in Appendix B.

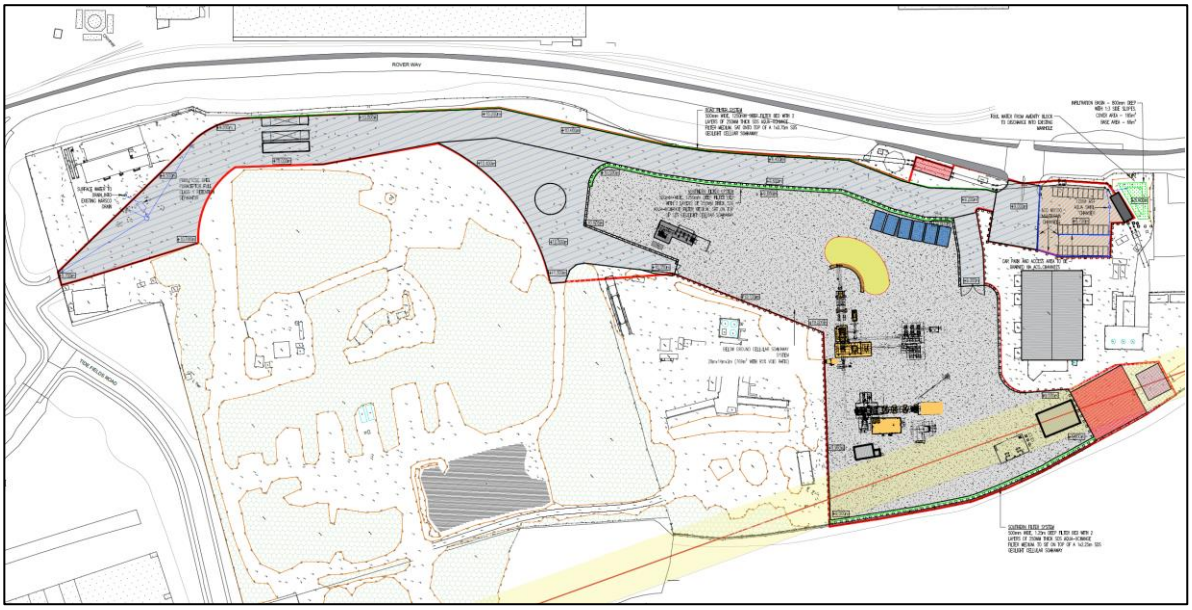


Figure 2-3 Extract from proposed site layout (Appendix B)

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.

PPW uses a series of Technical Advice Notes to provide more guidance on areas of planning and development in Wales. Technical Advice Note 15 (TAN15), introduced by the Welsh Government in 2004, provides technical guidance relating to development planning and flood risk in Wales.

The initial requirements of TAN15 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 TAN15 was released in October 2021 and was due to come in force on the 1st December 2021. However, Welsh Government have suspended the implementation of the new TAN15 until 1st June 2023. Furthermore, Welsh Government have subsequently provided guidance on the transition period between the initial release and the coming into force of the new TAN15. Although the new TAN15 is not a material consideration, Welsh Government and NRW are advising 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, even where the site is not shown to be at risk on the Development Advice Map. Vulnerability classification

TAN15 assigns one of three flood risk vulnerabilities to development, set out in Table 3-1.

The proposed development is identical in function and vulnerability to the existing development. As such, the proposals will not change the vulnerability of the site from its current classification as 'Less Vulnerable Development'.

Table 3-1: Development categories as defined by TAN15

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

3.2 Development Advice Map classification

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

Figure 3-1 shows the site is overwhelmingly located in Zone B. "*areas known to have been flooded in the past evidenced by sedimentary deposits*".

Zone C2 encroaches slightly into the site, extending across 1.98% of the site.

Paragraph 11.1 of TAN15 states that *"Where a site falls partially within zone C it will be a matter for the planning authority to judge whether to apply section 6, although it is probable that an assessment in accordance with section 7 and appendix 1 will be required."*

Given the very limited extent of C2, that there will be no change in development vulnerability and the questionable accuracy of the C2 flood extent (see Section 4.4), we conclude that it is not appropriate to apply the Justification Tests to the proposals. However, in line with the recommendations of Paragraph 11.1 of TAN15 an assessment in accordance with Section 7 and Appendix 1 should be undertaken.

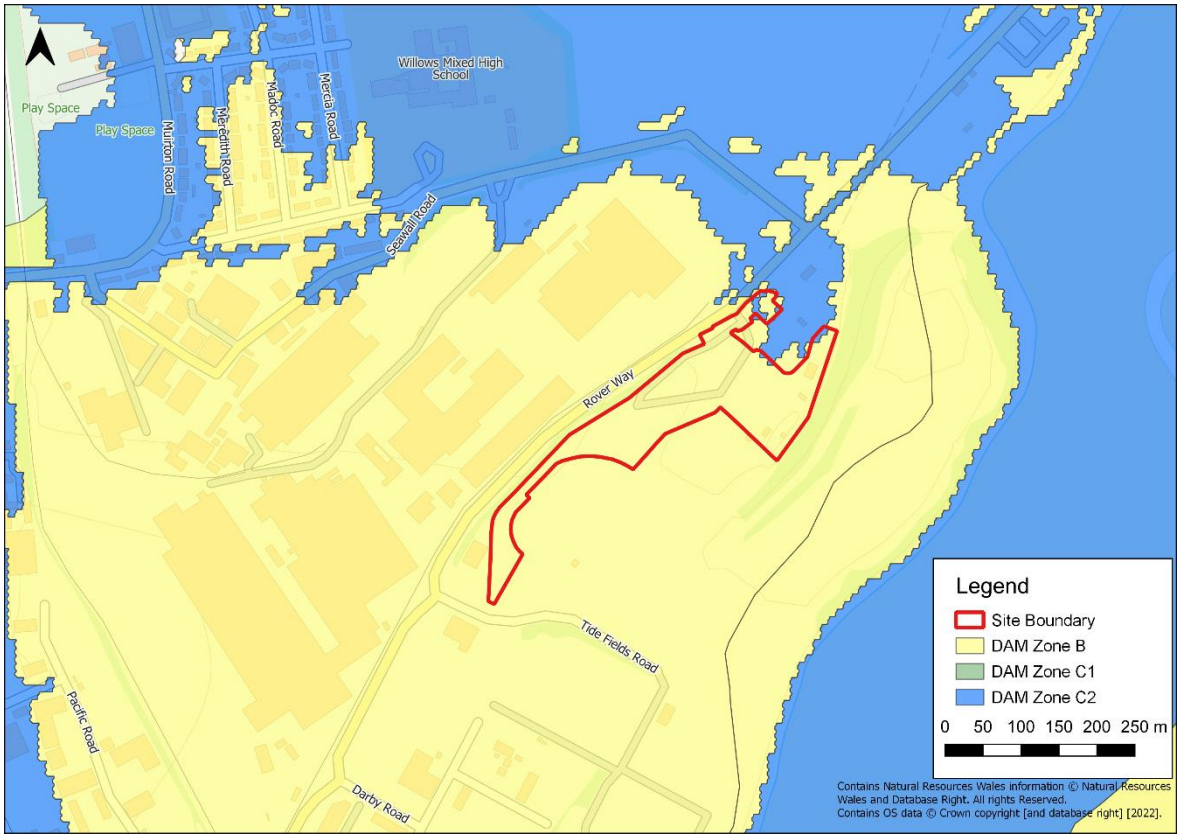


Figure 3-1: Development Advice Map

3.3 Flood Map for Planning

When implemented in June 2023, the new TAN15 will replace the DAM with the Flood Map for Planning (FMfP), which will be used to trigger different planning actions based on a precautionary assessment of flood risk. Importantly the FMfP includes for the predicted effects of climate change, whereas the DAM does not. This difference is particularly important in coastal locations where rising sea levels can significantly extend the extent of flood risk zones.

Welsh Government have advised[4] that although the new TAN15 and FMfP holds no formal weight as it is not yet national policy, material consideration may be given to the FMfP as best available information.

The site is located in Flood Zone 1 of the Flood Map for Planning for Rivers. This means that there is less than a 0.1% Annual Exceedance Probability (AEP) chance of fluvial flooding in any given year, including climate change. This is shown by a transparent layer on the Flood Map for Planning and as such a map has not been provided in this assessment.

As shown in Figure 3-2, the majority of the site is located in Flood Zone 1 of the Flood Map for Planning for the Sea. This means that there is less than a 0.1% Annual Exceedance Probability (AEP) chance of tidal flooding in any given year, including the effects of climate change. A small area of the eastern boundary of the site is in Flood Zone 2 (between 0.1% and 0.5% AEP, including climate change) and Flood Zone 3 (greater than 0.5% AEP, including climate change). These areas are however protected by the Rover Way flood embankment and are therefore categorised as being in a TAN15 Defended Zone. This means they are protected from flooding from the sea by flood risk management infrastructure to a minimum standard of protection of 1:200.

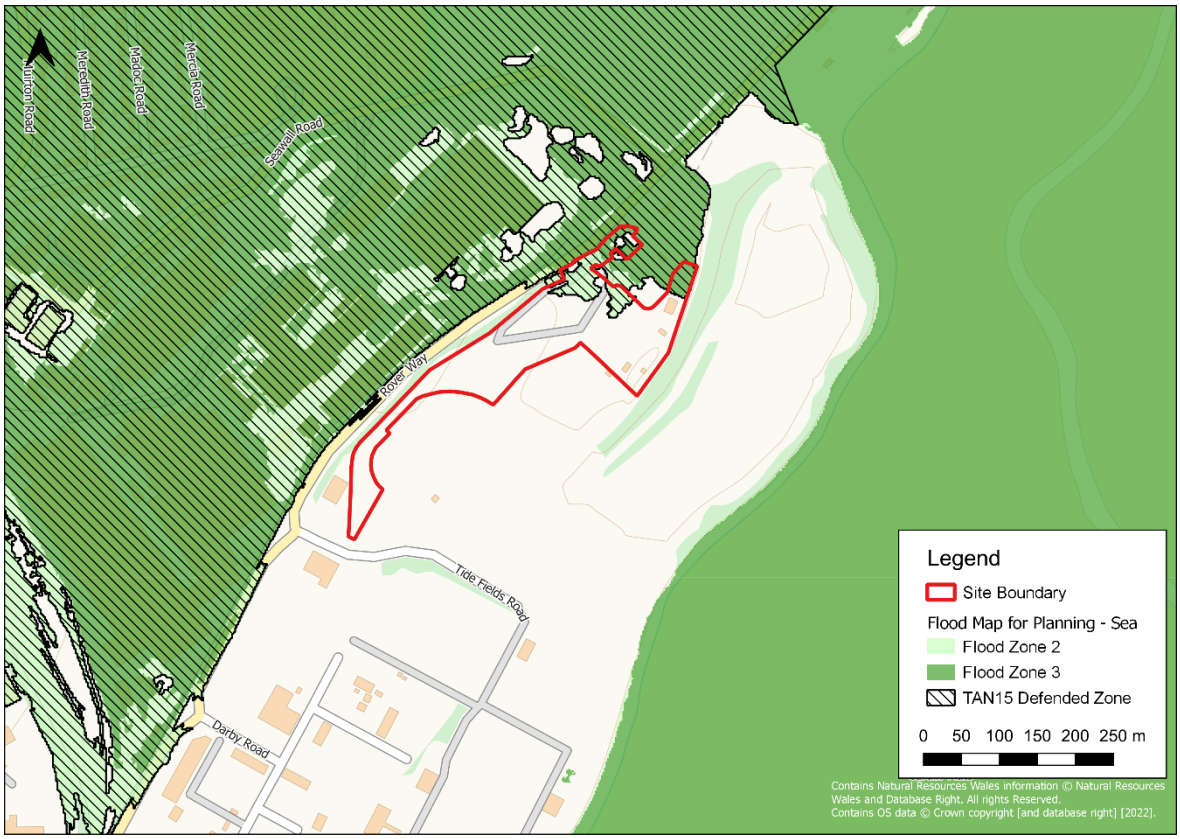


Figure 3-2 Flood Map for Planning – Sea

The majority of the site is in Flood Zone 1 of the Flood Map for Planning for Surface Water and Small Watercourses, as shown in Figure 3-3. This means that there is less than a 0.1% Annual Exceedance Probability (AEP) chance of flooding from these sources in a given year. Small areas within the site are however located in Flood Zone 2; this means there is between a 0.1% and 1% chance of flooding from surface water and small watercourses in a given year.

[4] Welsh Government Chief Planner Letter to LPA's. 15th December 2021. Ref MA-JJ-3967-21.

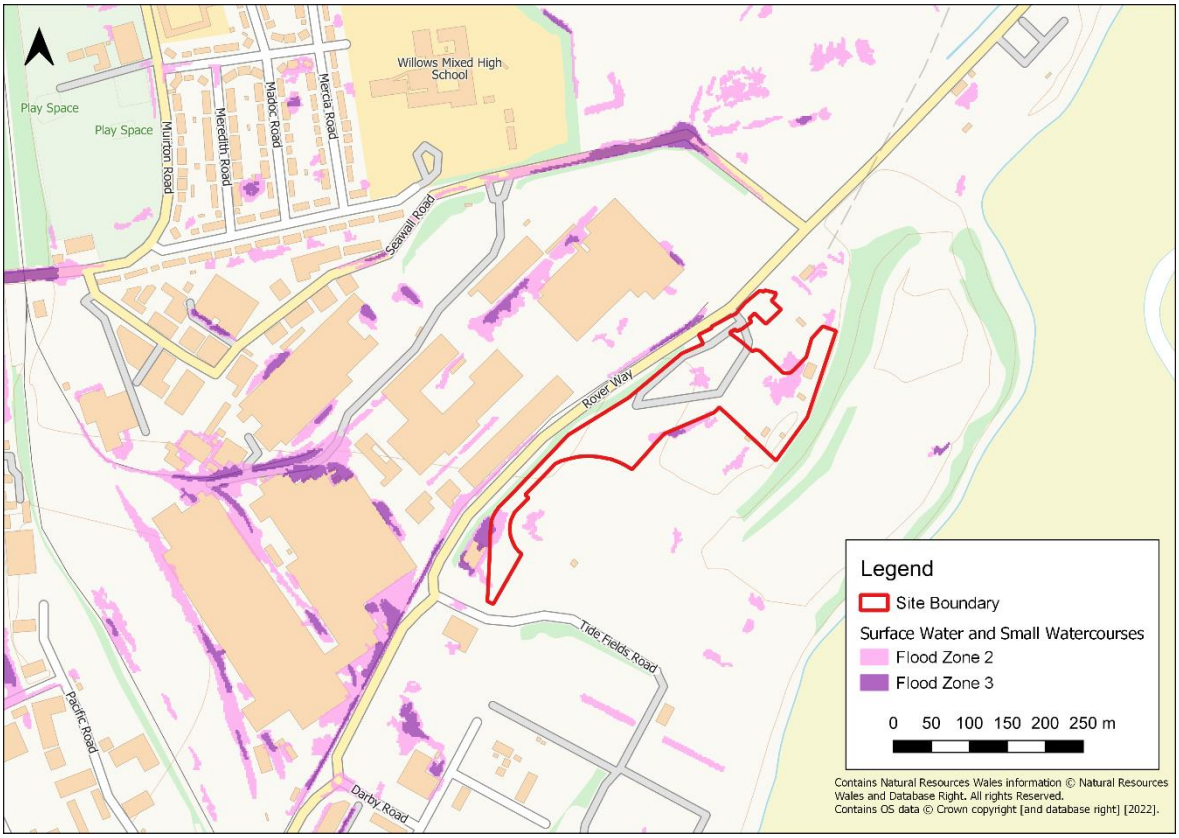


Figure 3-3 Flood Map for Planning – Surface Water and Small Watercourses

In a letter dated 14th January 2022, NRW clarified how they intended to respond to development management consultations, where flood risk is a material consideration. In particular, the letter stated:

'If a site is shown to not be at risk of flooding on the DAM but it is shown to be at risk of on the new Flood Map for Planning, our substantive response will be 'concerns' and we will recommend an FCA is submitted in support of the planning application. Where these concerns are not appropriately addressed, we are likely to object to the development'

As shown in Figure 3-1 and Figure 3-2 above, the site is shown not to be at risk of flooding on the DAM but it is shown to be at risk of on the new Flood Map for Planning. This Flood Consequence Assessment has therefore been prepared in line with NRW guidance.

4 Flood risk assessment

This section assesses the risk to the proposed development from all sources of flooding, the risk of increased flooding to others, and how flood risks can be managed. As a Level 1 FCA, the flood risk assessment is 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 in at very low risk of flooding from rivers (Section 4.3).
Flood Risk from the Sea	×	The site is presently at very low risk of tidal flooding (Section 4.4), although this is predicted to increase with climate change.
Flood Risk from Surface Water and Small Watercourses	✓	The site is at very low risk of surface water flooding (Section 4.5).
Flood Risk from Groundwater	×	The site is at very low risk of flooding from groundwater (Section 4.6).
Flood Risk from Reservoirs	×	The site is not at risk of flooding from reservoirs (Section 4.7).
Flood Risk from Sewers	×	There is no evidence to suggest that the site is at risk of flooding from sewers (Section 4.8).

4.2 Historical flooding

The site is not located within NRW's historic flood outline. The Cardiff County Council Flood Risk Management Plan[5] (2015) highlights Splott as one of the top communities at risk from flooding in Cardiff, largely ascribed to surface water flooding. There is however no specific mention of historic flooding to the proposed development site itself.

4.3 Flood risk from rivers

The site is at **very low risk** of flooding from rivers according to NRW's Flood Risk Assessment Wales (FRAW) Flood Risk from the Rivers map. This means that there is less than a 0.1% Annual Exceedance Probability (AEP) chance of fluvial flooding in any given year. This is shown by a transparent layer on the FRAW mapping and as such a map has not been provided in this assessment. This conclusion is further reinforced by the Flood Map for Planning (Section 3.4).

4.4 Flood risk from the sea

The site is at **very low risk** of flooding from the sea according to NRW's Flood Risk Assessment Wales (FRAW) Flood Risk from the Sea map shown in Figure 4-1. This means that there is less than a 0.1% AEP chance of tidal flooding in any given year.

[5] Cardiff Council. Cardiff Flood Risk Management Plan (2015) https://www.cardiff.gov.uk/ENG/resident/Community-safety/Flood-and-Coastal-Erosion-Risk-Management/Documents/Cardiff%20Flood%20Risk%20Management%20Plan.pdf

The FRAW tidal flood extent uses the same design event as the Development Advice Map Zone C. FRAW is however based on more recent and accurate flood modelling than the DAM and should therefore be given material consideration as best available information.

FRAW flood mapping does not account for the predicted effects of climate change. Consequently, given the site's proximity to the sea and the results of the Flood Map for Planning (Section 3.5), more detailed consideration of the flood risk from the sea has been undertaken in Section 5.

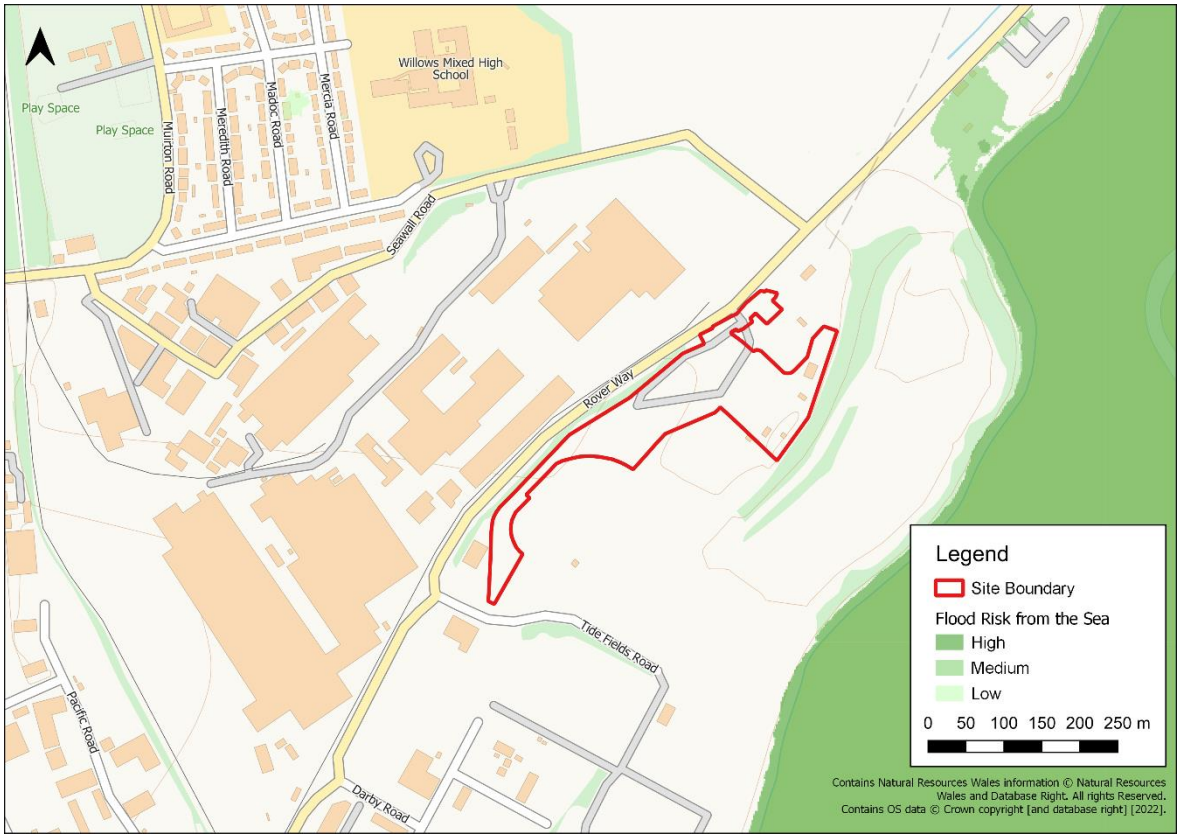


Figure 4-1 Risk of flooding from the sea

4.5 Flood risk from surface water and small watercourses

The majority of the site is at **very low risk** of flooding from surface water and small watercourses according to NRW's Flood Risk Assessment Wales (FRAW) Flood Risk from the Surface Water and Small Watercourses map shown in Figure 4-2. This means that there is less than a 0.1% AEP chance of flooding from these sources in any given year. There are however small pockets of the site at **low risk** (between 0.1% and 1% AEP) of flooding from these sources.

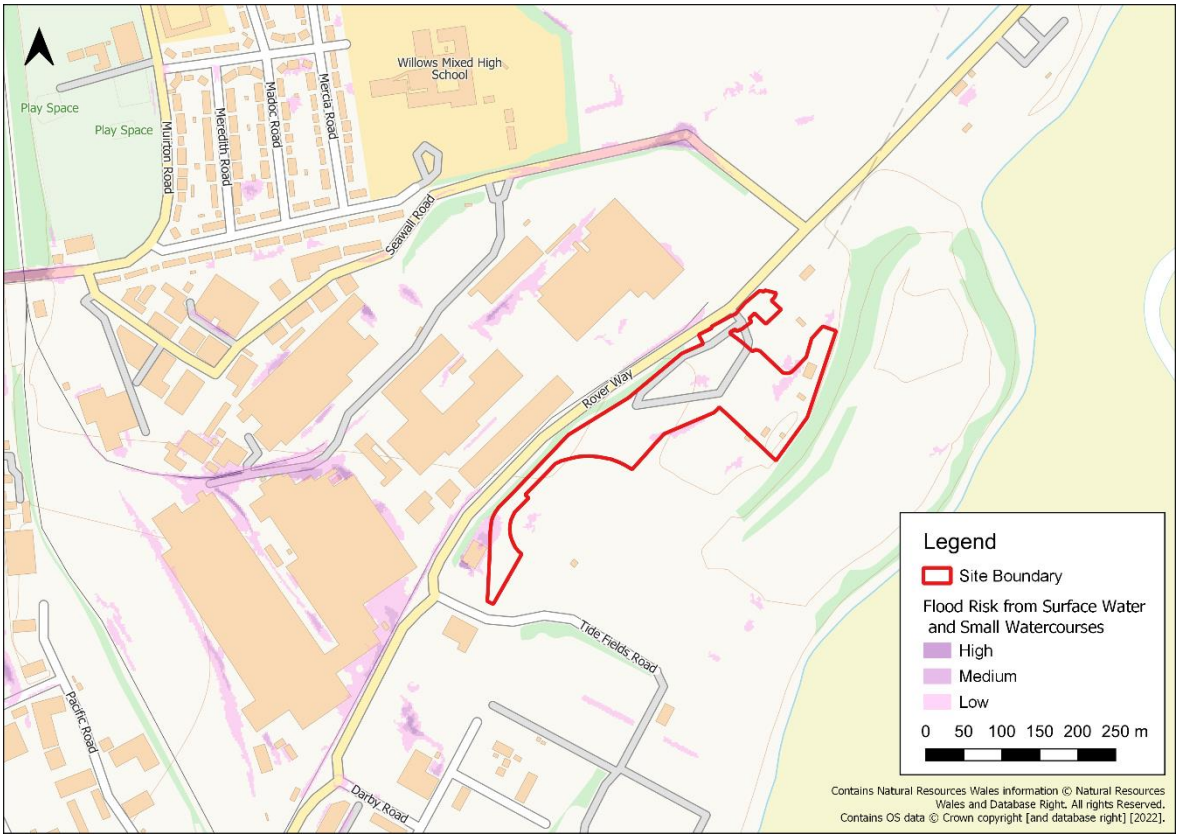


Figure 4-2: Risk of flooding from surface water and small watercourses.

4.6 Flood risk from groundwater

Groundwater flooding is caused by unusually high groundwater levels. It occurs as excess water emerging 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.

The Cardiff Local Flood Risk Management Strategy[6] states 'There is no information of historic groundwater flooding which suggests that the risk of groundwater flooding is low in Cardiff'. The risk of groundwater at the site is therefore considered to be **low**.

4.7 Flood risk from reservoirs

Given the absence of any nearby reservoirs, the NRW's reservoir flood map shows the site, and its surrounding area is not at risk of reservoir flooding. This is shown by a transparent layer on the NRW mapping and as such a map has not been provided in this assessment.

4.8 Flood risk from sewers

Splott was not one of the areas identified as previously experiencing flooding from sewers in the Cardiff Flood Risk Management Plan[5]. It can therefore be concluded that there is a low risk of sewer flooding at the site.

[6] Cardiff Council. Local Flood Risk Management Strategy (2014) https://www.cardiff.gov.uk/ENG/Your-Council/Strategies-plans-and-policies/Documents/Flood/Local%20Flood%20Risk%20Management%20Strategy.pdf

5 Detailed assessment of tidal flood risk

5.1 Detailed hydraulic modelling

The flood risk assessment of Chapter 4 identified tidal flooding as the main source of flood risk to the site. Consequently, the following chapter provides a more detailed assessment of tidal flood risk. This includes an estimate of flood levels and depths, using tidal projection methods. Extreme sea level estimates have been calculated and mapped for the 0.5% and 0.1% AEP events, for the present day (2022) and allowing for climate change over the 75 years lifetime of development (2097).

5.2 Extreme sea level estimates

Extreme sea level estimates have been taken from the Environment Agency Coastal Flood Boundary Conditions for UK Mainland and Islands; Design Sea Levels (ref. SC060064)[7]. Extreme sea level predictions are provided at node locations at approximately 2km spacing along the coastline. For this assessment the closest extreme sea level node is Node 408 located approximately 2.2km east of the site. The extreme sea level estimates for this node are shown in Table 5-1:

Table 5-1 Extreme sea level estimates (2017)

Event (AEP)	Predicted sea level (mAOD)
0.5%	7.91
0.1%	8.27

For all coastal locations, future sea level rise is a major consideration and should be applied to the extreme sea level estimates. Welsh Government guidance suggests that the lifetime of a development for an industrial site is 75 years, and so extreme sea level estimates have been uplifted to include sea level rise to 2097.

The UKCP18 User Interface[8] has been used in accordance with Welsh Government Guidance on Climate Change Allowances for Planning Purposes (September 2021)[9] to provide climate change uplifts for Cardiff. The cumulative increase in sea level has been calculated between 2017 and 2022 to uplift extreme sea level estimates to present day, and then furthermore to 2097. The climate change uplifts applied to the extreme sea level estimates are shown in Table 5-2. These values have been applied to the extreme sea level estimates to generate the predicted tidal flood levels contained in Table 5-3.

Table 5-2 Cumulative sea level rise

Period	Cumulative sea level rise (m increase)
2017-2022	0.03
2017-2097	0.73

[7] UK Government (2019) Coastal flood boundary conditions for the mainland UK coasts and islands https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/coastal-flood-boundary-conditions-for-the-mainland-uk-coasts-and-island

[8] UK Climate Projections User Interface. https://ukclimateprojections-ui.metoffice.gov.uk/ui/home.

[9] Welsh Government. Flood Consequences Assessment: Climate Change Allowances (Sept 2021) https://gov.wales/sites/default/files/publications/2021-09/climate-change-allowances-and-flood-consequence-assessments_0.pdf.

Table 5-3 Predicted tidal flood levels

Event (AEP)	2022 Still Water Level (mAOD)	2097 Still Water Level (mAOD)
0.5%	7.94	8.64
0.1%	8.30	9.00

Using the extreme sea level estimates and climate change uplifts calculated in Table 5-3, the predicted still water levels have been mapped by tidal projection for the 0.5% AEP and 0.1% AEP events in 2097.

Depth grids, using 1m LiDAR Digital Terrain Model (DTM) data and the predicted still water levels, were created to determine the predicted the depth and extent of flooding at the proposed development site for the events in Table 5-3.

This method of predicting tidal flood risk does not truly represent the hydraulic connectivity of areas to tidal water, but rather assumes the same water levels is maintained across all areas irrespective of the distance from the coast for intervening landform features for structures. It is therefore important to note that tidal projection modelling is typically conservative by nature.

5.3 Tidal flood risk

5.3.1 0.5% AEP Event (2022)

As shown in Figure 5-1, the site is predicted to be flood free in the present day 0.5% AEP event.

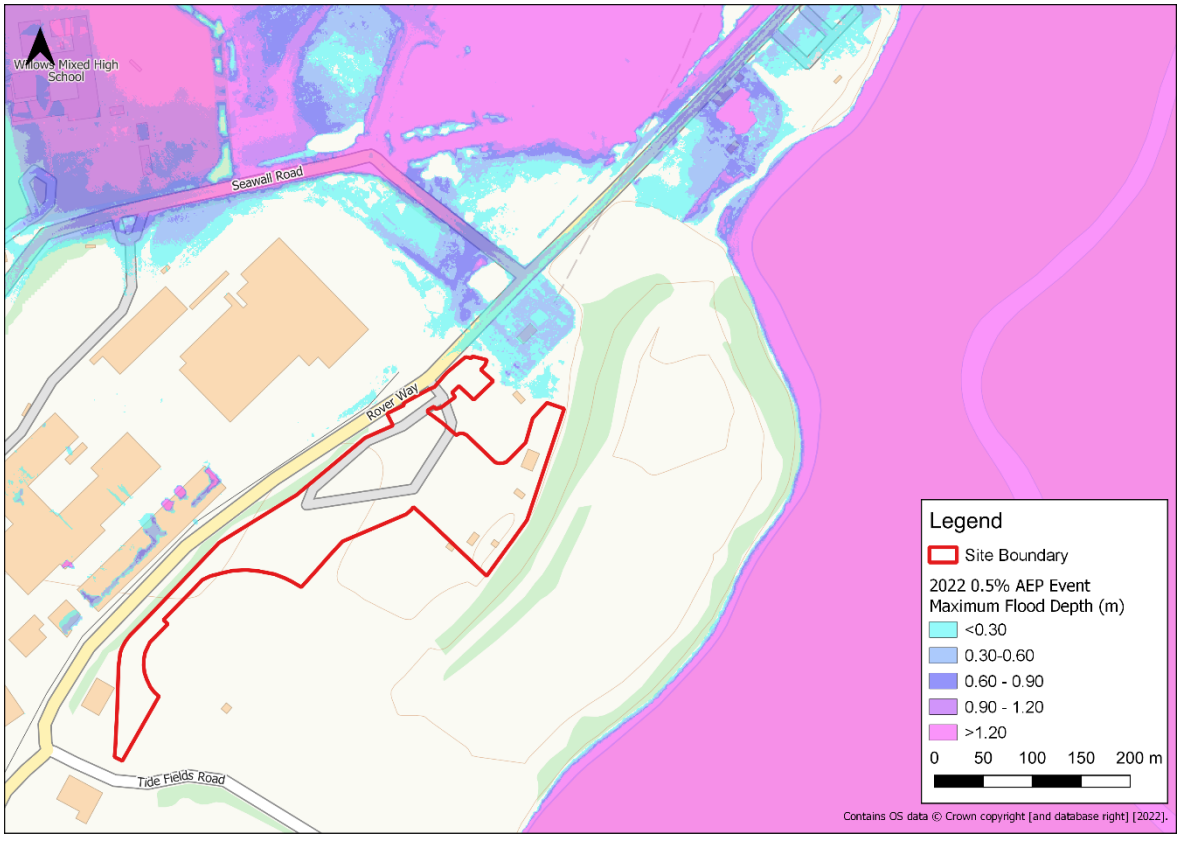


Figure 5-1 0.5% AEP event maximum flood depth

5.3.2 0.5% AEP Event (2097)

As shown in Figure 5-2, the site is predominantly flood free in the 2097 0.5% AEP event, with a predicted flood level of 8.64mAOD.

A more detailed extract of predicted flood depths in the northeast of the site is shown in Figure 5-3. This figure is based on LiDAR ground levels and not those from the topographical survey. The topographical survey shows that the lowest existing ground levels around the proposed amenity block are 8.49mAOD, and therefore this area is predicted to be at risk of flooding to a maximum depth 150mm. The lowest level within the Haith plant operations area is 8.36mAOD and therefore flooding is predicted to reach depths of up to 280mm in this area.

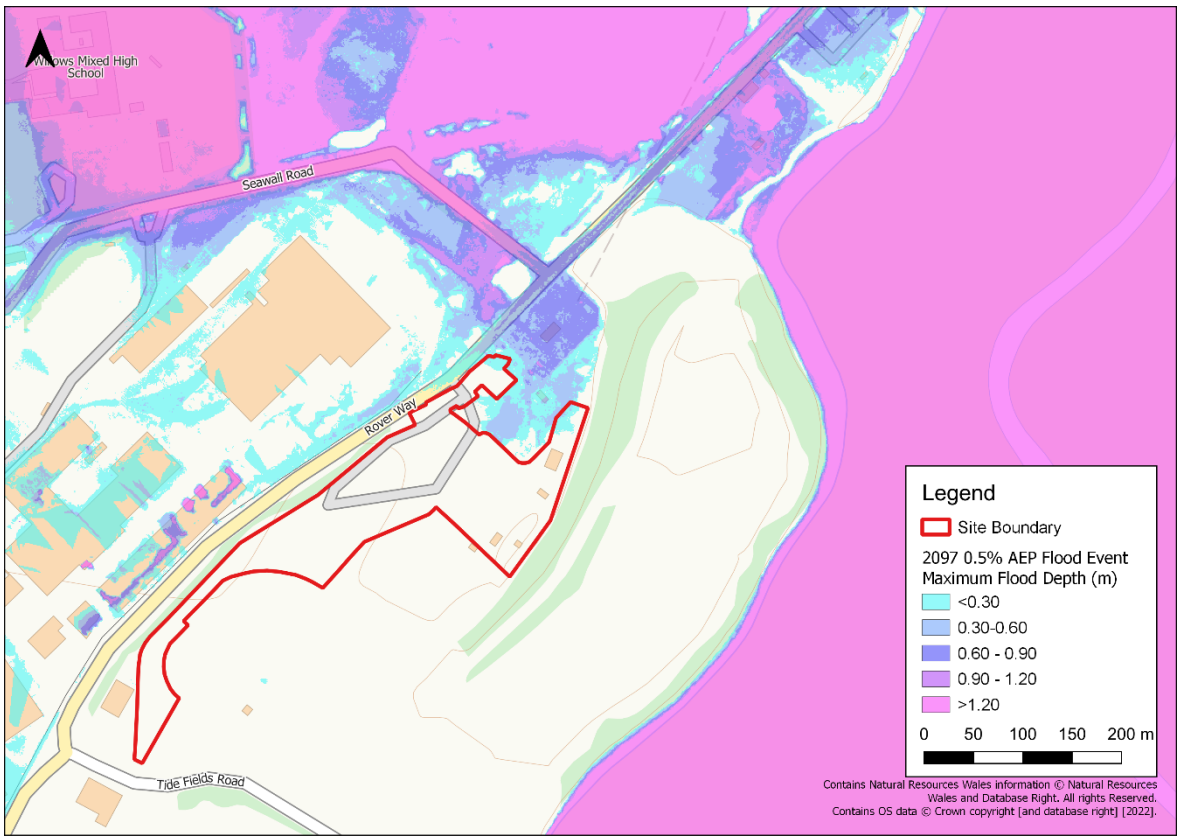


Figure 5-2 0.5% AEP event 2097- overview of flood risk

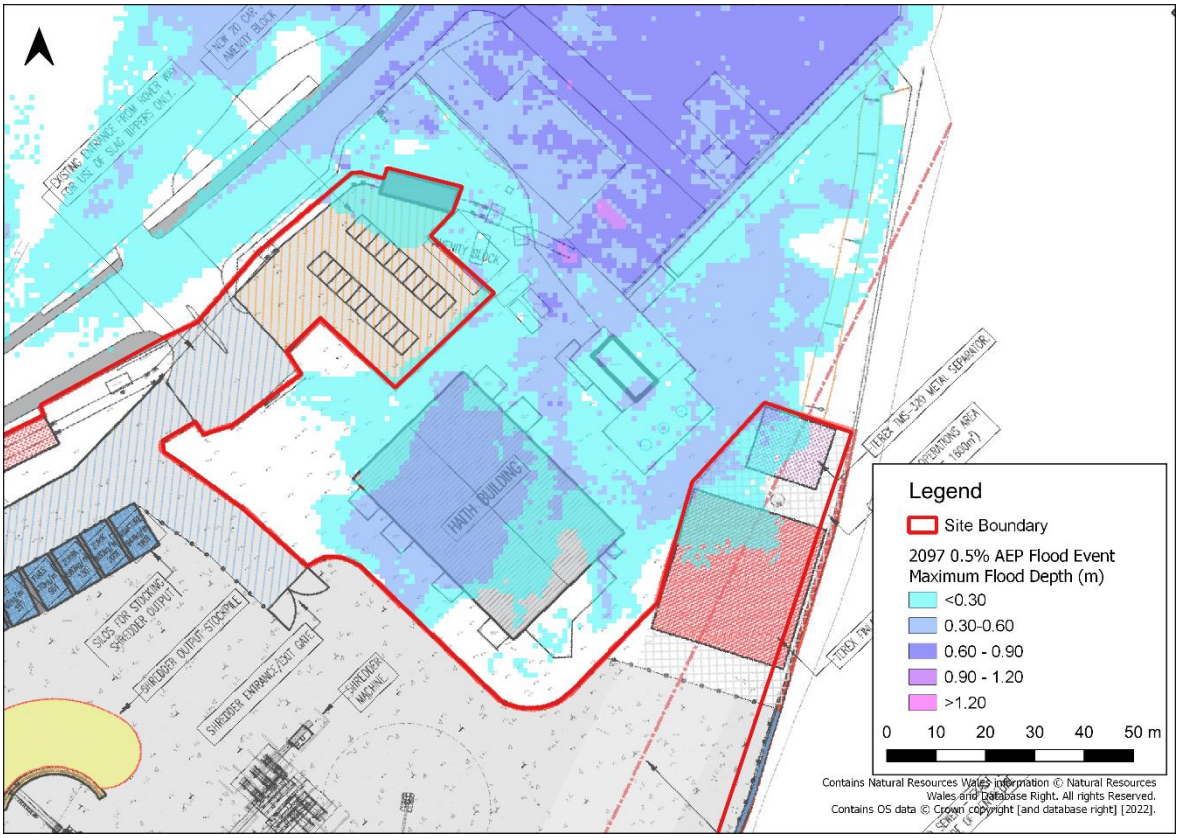


Figure 5-3 0.5% AEP event 2097- areas at risk of flooding

5.3.3 0.1% AEP Event (2022)

As shown in Figure 5-4, the site is predicted to be flood free in the present day 0.1% AEP event.

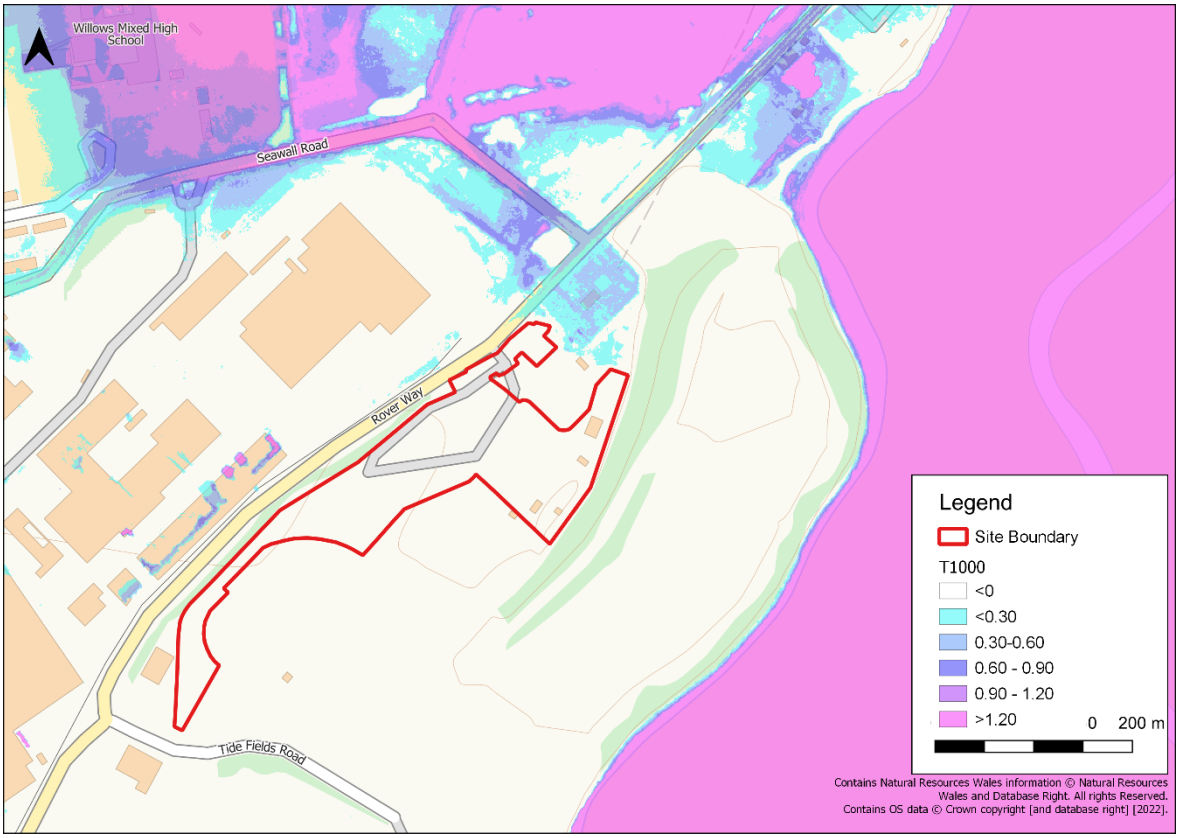


Figure 5-4 0.1% AEP event 2022

5.3.4 0.1% AEP Event (2097)

Figure 5-5 shows that the site is predominantly flood free in the 2097 0.5% AEP event, with a predicted flood level of 9.00mAOD.

A more detailed extract of predicted flood depths in the northeast of the site, is shown in Figure 5-6. The topographical survey shows that the lowest existing ground levels around the proposed amenity block are 8.49mAOD, and therefore this area is predicted to be at risk of flooding to a maximum depth of 510mm. The lowest level within the Haith plant operations area is 8.36mAOD and therefore flooding is predicted to reach depths of up to 640mm in this area. The remaining hardstanding at the east of the site has a minimum level of 8.72mAOD and is therefore predicted to flood to depths up to 280mm.

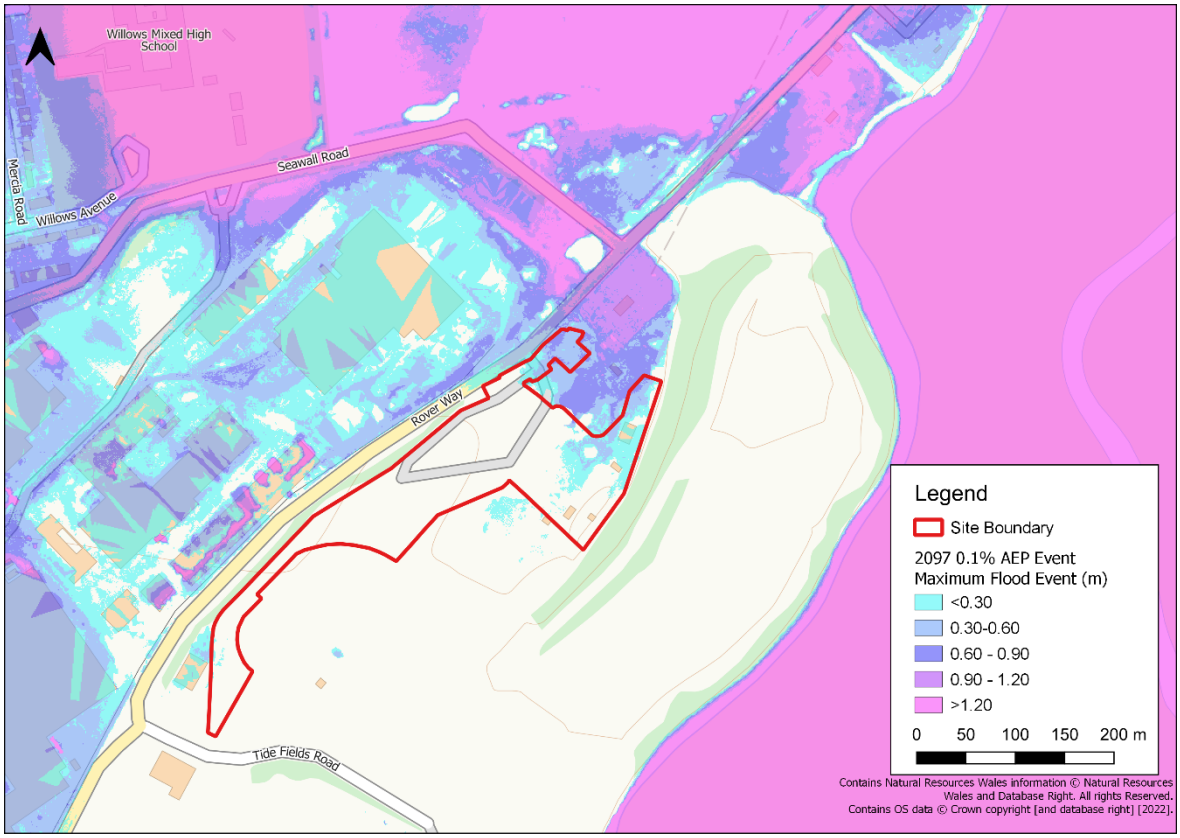


Figure 5-5 0.1% AEP event (2097)- overview of flood risk

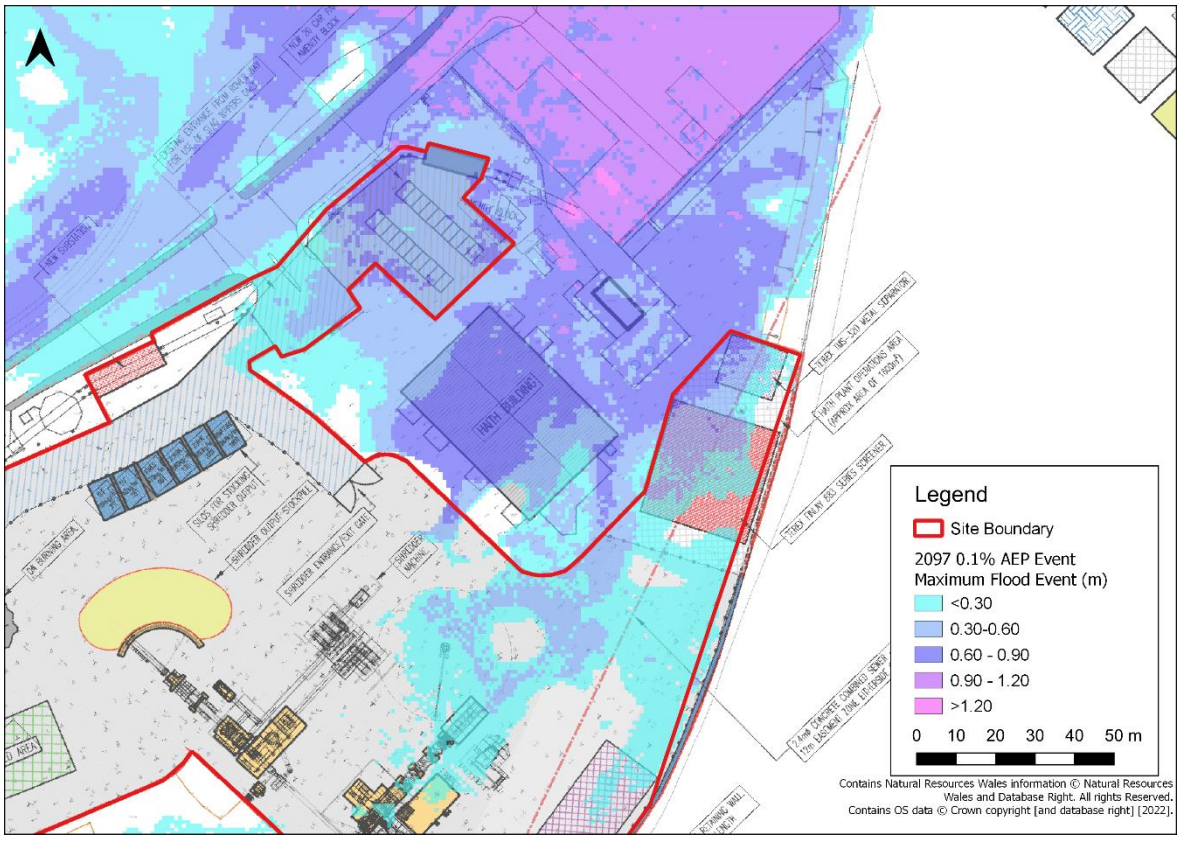


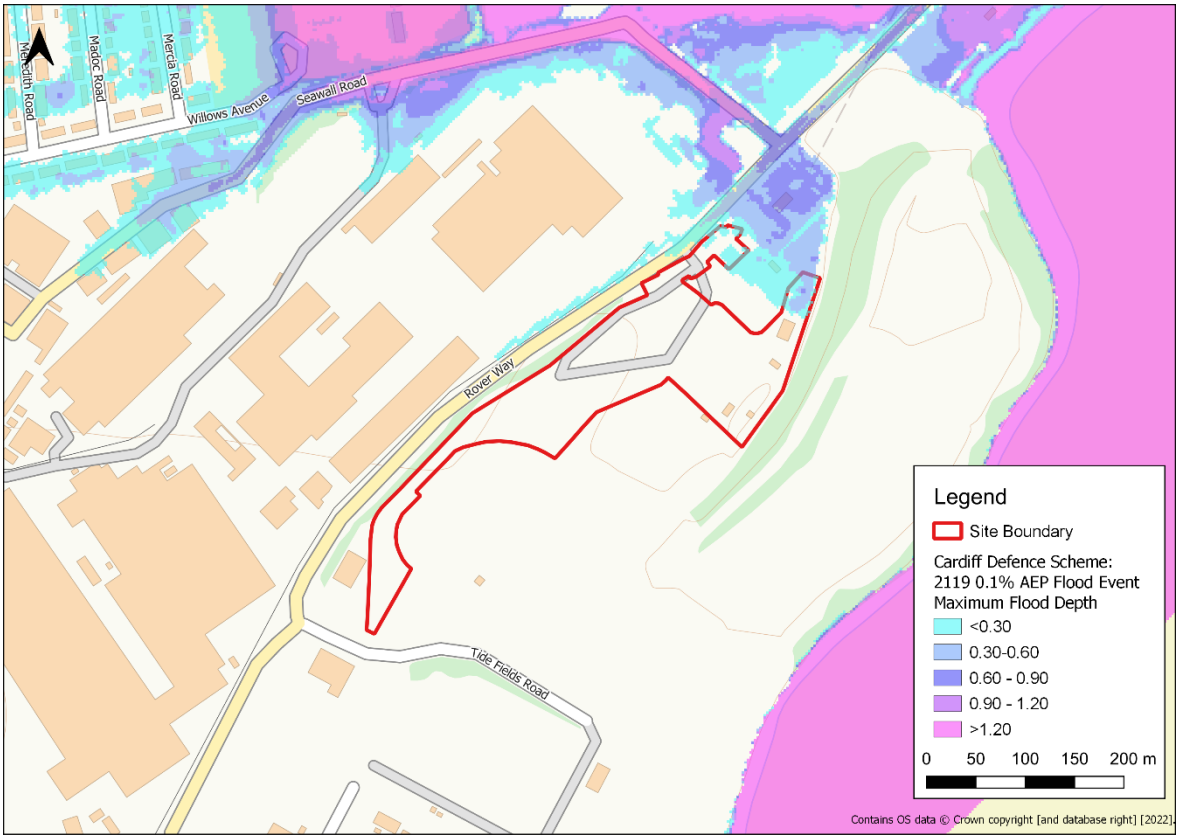
Figure 5-6 0.1% AEP event (2097)- areas at risk of flooding

5.4 Cardiff coastal defence scheme

Cardiff City Council is in the process of gaining planning permission (ref. 21/02138/MJR[10]) to construct a series of tidal and coastal defences along the Severn estuary coastline and the banks of the River Rhymney. This includes a new rock armour revetment along the Severn estuary, extending from the privately owned Dŵr Cymru Welsh Water (DCWW) defences, along the coastline south of the Celsa Steel site, to the mouth of the River Rhymney.

To inform this scheme, a hydraulic model was developed by JBA consulting in 2016 and updated in 2020[11]. This model considers the baseline and post-development scenarios up to the 0.1% AEP event for both 2019 and 2119 to take into account the impacts of climate change. The post-development model shows the site to be flood free in the 2019 0.5% and 0.1% AEP events as well as in the 2119 0.5% AEP event. As shown in Figure 5-7, the site is predominantly flood free in the 2119 0.1% AEP event with small areas of flooding at the eastern boundary of the site. This includes the car park for the amenity block which is predicted to experience flood depths up to 160mm. Flood depths for the Haith Plant operations area are predicted to be up to 500mm.

These detailed predictions of flood risk are significantly lower than those from the tidal projection modelling, even though the modelling for the flood defence scheme assumes 100 years of climate change, and not the less 75 year lifetime of development. Consequently, it is reasonable to conclude that on completion the new coastal flood defences will protect the site from flooding over the 75 year lifetime of development.



10 Cardiff Coastal Flood Defence Scheme https://planningonline.cardiff.gov.uk/online-applications/applicationDetails.do?keyVal=_CARDIFF_DCAPR_136569&activeTab=summary
11 JBA Consulting (2021) Cardiff Coastal Defences- Flood Consequence Assessment https://planningonline.cardiff.gov.uk/online-applications/files/F087CF3B3479B99A07E0BD71A391D1FD/pdf/21_02138_MJR-FLOOD_CONSEQUENCE_ASSESSMENT-2522298.pdf

Figure 5-7 Proposed flood and erosion defences

5.5 Flood Mitigation

The site levels presented in the topographic survey shows the east of the site is currently at some risk of flooding in the 2097 0.5% AEP event. To minimise the risk of flooding, ground levels across the site will be raised to above the 2097 0.5% AEP level of 8.64mAOD. This is particularly relevant for the amenity block and associated parking at the northeast of the site and the Haith plant area at the southeast of the site. This will require ground levels to be raised by as much as 280mm in localised areas.

5.6 Flood risk summary and compliance with TAN15

Table **5**-**4** shows the maximum depths of flooding on site following implementation of flood mitigation measures. This is based on precautionary tidal projection modelling and does not account for the expected flood protection provided by the Cardiff Coastal Defence Scheme.

By raising all areas to a level greater than 8.64mAOD, the proposed development is predicted to be entirely flood free in the 2097 0.5% AEP event. As such the proposals satisfy the requirements of TAN15 A1.14.

In the 2097 0.1% AEP event, the site is predicted to flood to a maximum depth of 360mm. TAN15 states the maximum depth of flooding for an industrial site is 1000mm. The flood depths modelled are well below this depth in all scenarios, with most of the site remaining flood free. The flood risk is therefore well within the recommended tolerable limits of TAN15 A1.15.

The flood risk identified shall be further reduced with the implementation of the proposed Cardiff Coastal Defence Scheme. Under the scheme, the site is expected to be flood free in all relevant TAN15 design events.

Table 5-4 Predicted flood depths

Event	Still Water Level (mAOD)	Maximum flood depth on site (mm)
2022 0.5%	7.94	0
2022 0.1%	8.30	0
2097 0.5%	8.64	0
2097 0.1%	9.00	360

6 Assessment of Acceptability Criteria

Table 6-1 assesses the proposed development against the acceptability requirements.

Table 6-1 Acceptability Criteria for TAN15

TAN15 Acceptability Criteria	Comments	Assessment
Developer is required to demonstrate that the site is designed to be flood-free for the lifetime of development for a 1 in 100 (1% AEP) chance (fluvial) and 1 in 200 (0.5%) chance (tidal) flood event including an allowance for climate change in accordance with TAN15 Table A1.14.	The proposed site levels will be set above the 2097 0.5% tidal flood event. The site is therefore predicted to be flood free in this key event.	✓
In respect of the residual risk to the development it should be designed so that in an extreme (1 in 1000 chance) [0.1% AEP] event there would be less than 1000mm of water on access roads and within the property, the velocity of any water flowing across the development would be less than 0.45m/s.	Maximum flood depths in the 0.1% AEP 2097 event are predicted to be 360mm. Actual levels are likely to be lower still due to the planned implementation of the Cardiff Coastal Defence Scheme.	✓
No flooding elsewhere	The proposed development shall not increase flood risk elsewhere as it is generally not possible to displace flood waters from tidal inundation given the effectively limitless volume of the sea.	✓
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 assessment of flood risk in this FCA has not relied upon the presence of any current or proposed flood defences. It is therefore a precautionary assessment of flood risk. The current and proposed improved Cardiff Coastal defences are the responsibility of Cardiff City Council.	✓
The developer must ensure that future occupiers of the development are aware of the flooding risks and consequences.	N/A The developer is the occupier.	✓
Effective flood warnings are provided at the site.	The site is located within the Coast from Aberthaw to Severn Bridge Flood Alert Area.	✓
Escape/evacuation routes are shown by the developer to be operational under all conditions.	Internal site access roads leading to Rover Way and Tide Fields Road are predicted to be flood free in all tidal events.	✓
The development is designed by the developer to allow the	If goods need to be removed from the building the tidal nature of	✓

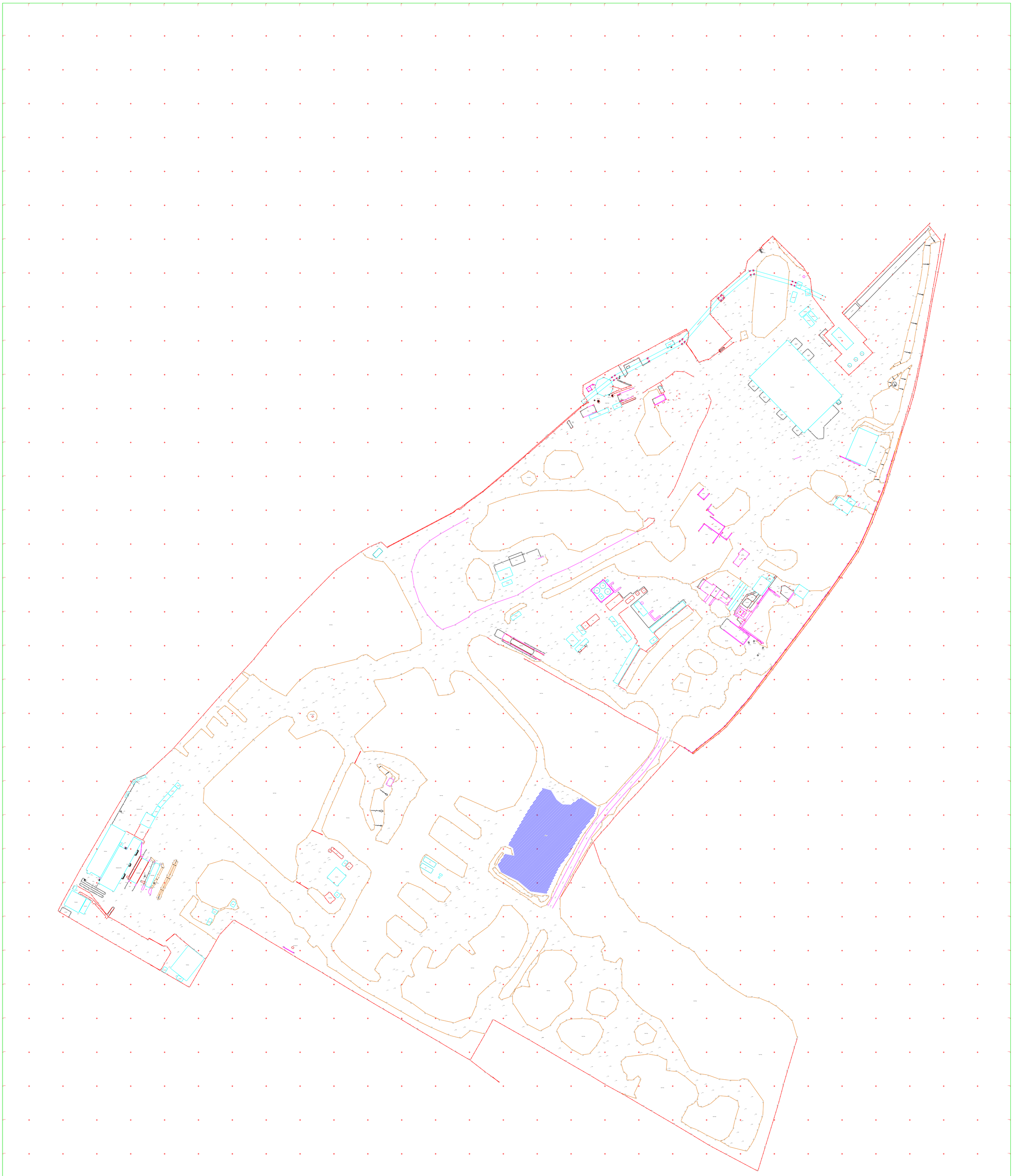
occupier of the facility for rapid movement of goods/possessions to areas away from flood waters.	flooding provides a long lead time (> 24 hours). Additionally, much of the site is predicted to be free from flooding in all design events.	
Development is designed to minimise structural damage during a flood event and is flood proofed to enable it to be returned to its prime use quickly in the aftermath of a flood.	All machinery and storage units will be raised above the 2097 0.5% AEP flood level. Any flooding in more extreme events will be shallow, posing little or no risk of structural damage.	✓

7 Conclusions

- JBA Consulting were commissioned to prepare a Flood Consequence Assessment (FCA) to support a planning application to install a shredder plant and associated works within the existing Celsa Steel recycling site, Cardiff
- The proposed development is identical in function and vulnerability to the existing development. As such, the proposals will not change the vulnerability of the site from its current classification as 'Less Vulnerable Development'.
- The proposed development lies in Zone B of the Natural Resources Wales (NRW) Development Advice Map (DAM). Zone B is described as "*areas known to have been flooded in the past evidenced by sedimentary deposits*". Although Zone C2 encroaches slightly into the site, given the limited extent, that there will be no change in development vulnerability and the questionable accuracy of the C2 flood extent, we conclude that it is not appropriate to apply the Justification Tests to the proposals.
- The development lies within Flood Zone 3 of the draft Flood Map for Planning for the Sea. Consequently, the FCA has been prepared on a precautionary basis as advised by NRW.
- NRW's Flood Risk Assessment Wales maps shows the site has a very low risk of all sources of flooding.
- Extreme sea level calculations and tidal projection mapping, shows the site to be flood free in the present day (2022) 0.5% and 0.1% AEP events.
- To manage the increased risk of tidal flooding associated with climate change, ground levels in the northeast of the site will be raised above the 2097 0.5% AEP flood level (8.64mAOD). In the extreme 2097 0.1% AEP event maximum flood depths are predicted to be 360mm, limited to the northeast area of the site.
- The risk of flooding is expected to be further reduced at the site with the implementation of the Cardiff Coastal Defence Scheme. Under this scheme, the site is predicted to be flood free in the 0.5% and 0.1% AEP events with climate change allowances over the 75 year lifetime of the development, irrespective of the proposed flood mitigation.
- This FCA has demonstrated that all aspects of the acceptability criteria set out in TAN15 have been satisfied. Consequently, we conclude that on the grounds of flood risk, the proposed development meets the requirement set out in TAN15 and the aims of Planning Policy Wales.

Appendices

A Topographic Survey



BUILDING 58
CASTLE WORKS
EAST MOORS ROAD
CARDIFF
CF24 5NN

SURVEY BY
JOHN VINCENT SURVEYS LTD
NEEMAN HOUSE
MONASTERY ROAD
NEATH ABBEY BUSINESS PARK
NEATH SA10 7DR
TEL. (01792) 812488
DATE: MARCH 2022 DRAWING NO. 001/22

SCRAP HANDLING FACILITY

CELSA

SITE SURVEY

CELSA STEEL (UK) LTD

BUILDING 58
CASTLE WORKS
EAST MOORS ROAD
CARDIFF
CF24 5NN

SCALE 1:000 @ UNDEFINED

LEVELS RELATED TO ORDNANCE SURVEY O.P.S. DATUM

CAD REFERENCE: CELSA SLAG

B Proposed site layout

ROVER WAY

SEAWALL ROAD

TIDE FIELDS ROAD

Tanks

Mast

Tank

Tanks

SURFACE WATER TO DRAIN, INTO EXISTING HARSCO DRAIN

POR5/TCSC SPEL PURACEPTOR FUEL CLASS 1 RETENTION SEPARATOR

ROAD FILTER SYSTEM
500mm WIDE, 1250mm DEEP FILTER BED WITH 2 LAYERS OF 250MM THICK SDS AQUA-XCHANGE FILTER MEDIUM, SAT ONTO TOP OF A 1x0.75m SDS GEOLIGHT CELLULAR SOAKAWAY

NORTHERN FILTER SYSTEM
~500mm~WIDE, 1250mm DEEP FILTER BED WITH 2 LAYERS OF 250MM THICK SDS AQUA-XCHANGE FILTER MEDIUM, SAT ON TOP OF SDS GEOLIGHT CELLULAR SOAKAWAY

BELOW GROUND CELLULAR SOAKAWAY SYSTEM
28mx14mx2m (769m³ WITH 95% VOID RATIO)

FOUL WATER FROM AMENITY BLOCK TO DISCHARGE INTO EXISTING MANHOLE

INFILTRATION BASIN – 800mm DEEP WITH 1:3 SIDE SLOPES.
COVER AREA – 185m²
BASE AREA – 66m²

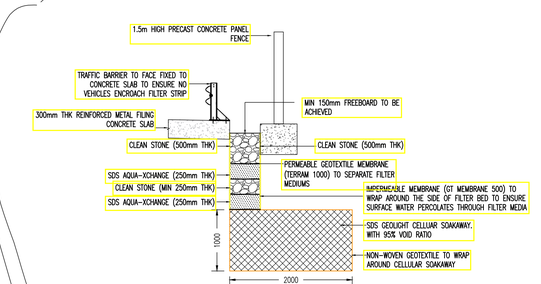
1200P ASP AQUA SWIRL CHAMBER

ACO MD150 MULTISPAN CHANNELS

CAR PARK AND ACCESS AREA TO BE DRAINED VIA ACO CHANNELS

SOUTHERN FILTER SYSTEM
500mm WIDE, 1.25m DEEP FILTER BED WITH 2 LAYERS OF 250MM THICK SDS AQUA-XCHANGE FILTER MEDIUM. TO SIT ON TOP OF A 1x2.25m SDS GEOLIGHT CELLULAR SOAKAWAY

+10.000m +10.200m +10.450m +9.400m +9.200m +9.000m +8.900m +8.700m +9.500m +10.400m +10.500m +9.600m +9.800m +10.900m +10.700m +10.300m +11.300m +10.150m +9.300m +10.100m +10.000m +9.000m +8.660m +9.500m +9.600m



NORTHERN FILTER STRIP DETAIL
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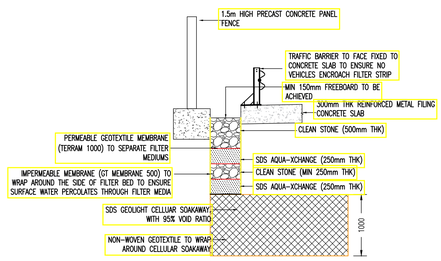

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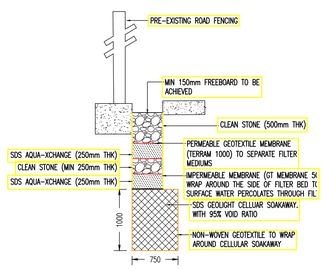

ROAD FILTER STRIP DETAIL
SCALE 1:50

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No.	REVISION	by	date

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Job title
REDEVELOPMENT, SCRAP HANDLING FACILITY, MINERAL SITE, TREMORFA, CELSA

Drawing title
PROPOSED DRAINAGE LAYOUT

	by	date
drawn	K.J	22.04.22
checked	K.J	22.04.22
approved	K.J.T	22.04.22

Job No: 21.121 | Drawing No: C05 | Rev:
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