

Neath Port Talbot Council

**Pontardawe Arts Centre, Herbert Street,
Pontardawe, Swansea, SA8 4ED**

Flood Consequence Assessment



Google Streetview image of shared space area and indicative site of proposals (in red box) with shopping street on right.

17th March 2022 V2

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The consultant has followed accepted procedure in providing the services, but given the residual risk associated with any prediction and the variability which can be experienced in flood conditions, the consultant takes no liability for and gives no warranty against actual flooding of any property (client's or third party) or the consequences of flooding in relation to the performance of the services.

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Version history

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D1	20.12.21	CO	CO	Issued for approval
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Issue history

Version	Date	Issued to	Method
D1	20.12.21	KB2 Consulting Engineers	Email pdf
V2	17.03.22	Ditto	Ditto

1.0 Introduction

- 1.1.1 A new cinema room and foyer are proposed on an existing external public paved area as an extension to Pontardawe Arts Centre, to include improved circulation and welfare facilities.
- 1.1.2 This Flood Consequence Assessment refers to TAN 15 dated July 2004 and the Development Advice Map (DAM), as advised by the Welsh Minister's letter dated 23rd November 2021 following the decision to defer the introduction of the updated TAN 15 until June 2023. However, the latest NRW flood maps have been included where relevant.
- 1.1.3 The site is shown to be in Flood Zones 2 and 3 according to the Natural Resources Wales (NRW) Flood Map for Planning and in C1 – served by significant infrastructure including flood defences, according to the DAM.
- 1.1.4 According to the NRW Surface Water Flooding Maps the site of the proposed building is shown to be at very low risk from surface water flooding.
- 1.1.5 This Flood Consequence Assessment (FCA) has been prepared by Clive Onions Limited to consider flood risk and to show that the development will be safe during its lifetime, including allowance for climate change, without increasing flood risk elsewhere.

2.0 Site Location and Setting

- 2.1.1 The site is located at Pontardawe Art Centre and Theatre, Herbert St, Pontardawe SA8 4ED.

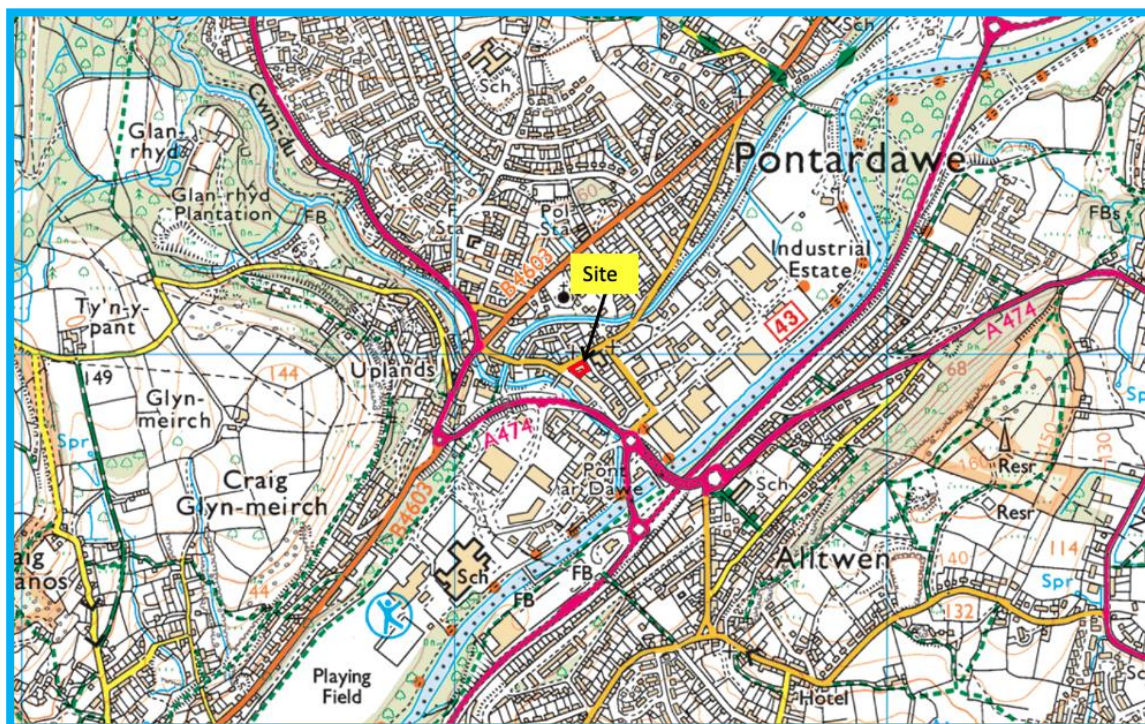


Fig 1 Site location (Streetmap).

2.1.2 The site is located in the following setting:

- a) Northwest of the site is Holly Street beyond which is a church and housing with gardens fronting onto Holly Street. The disused Swansea Canal is 100m north of the site, beyond which the land rises relatively steeply.
- b) Northeast of the site is Pontardawe Hub, shops, a church and residential development with gardens leading to a large industrial estate on land generally lower than the site.
- c) Southeast of the site is the main mixed shopping street called Herbert Street, with flats and mixed uses above, beyond which is the industrial estate with the River Tawey 290m from the site, flowing southwards.
- d) Southwest of the site is a wide public shared space through which the Herbert Street traffic passes, with a disused cinema, more shops the Upper Clydach River (over which the canal crosses), parking and then the A474, on rising land to the west. The Upper Clydach River is 45m from the site.

2.1.3 The site can therefore be described as being in the central hub of Pontardawe with many mixed-use community uses in the area and a former cinema across the road to the southwest. The land rises to the northwest and falls to the northeast, east and southeast.

2.1.4 The site shown in the images is generally the entire Arts centre site, which includes the proposed cinema.

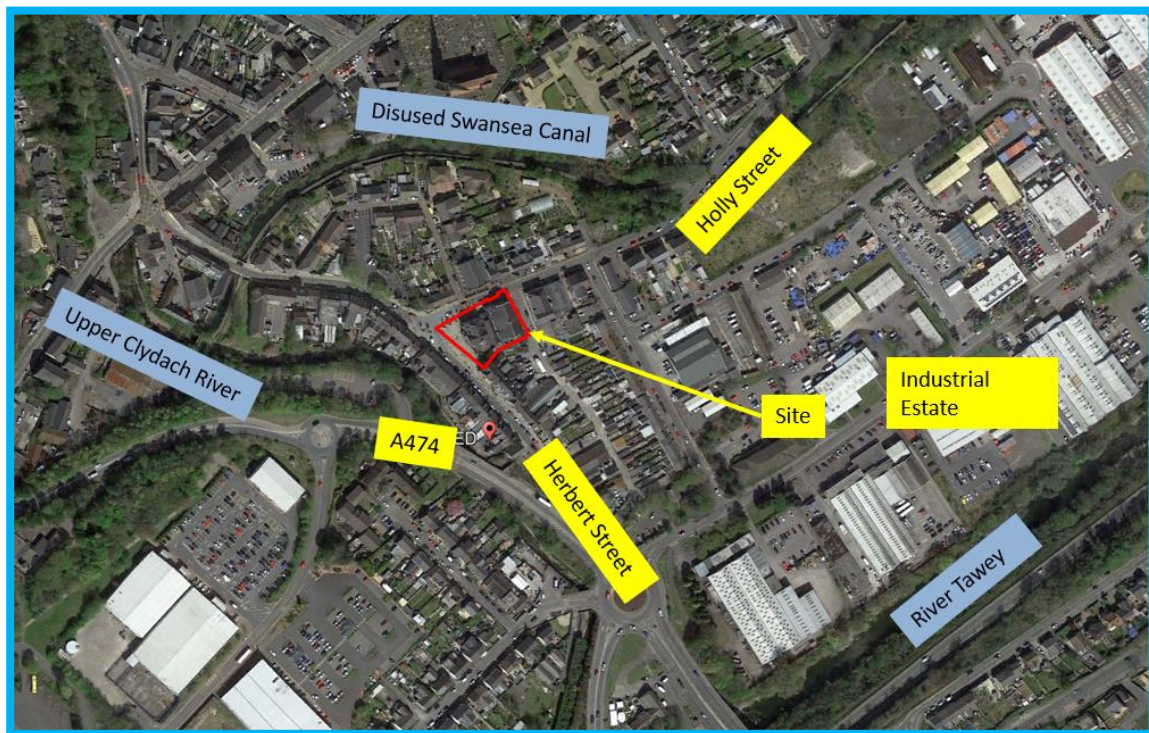


Fig 2 Annotated satellite view of site and surrounding area (Google Earth).

3.0 Existing Development and Ground Conditions

- 3.1.1 The site is roughly rectangular in shape and is approximately 35m north-south and 50m east-west and is approximately 0.15ha.
- 3.1.2 The site comprises the Pontardawe Arts Centre and the paved shared space area and war memorial to the southwest of the buildings.

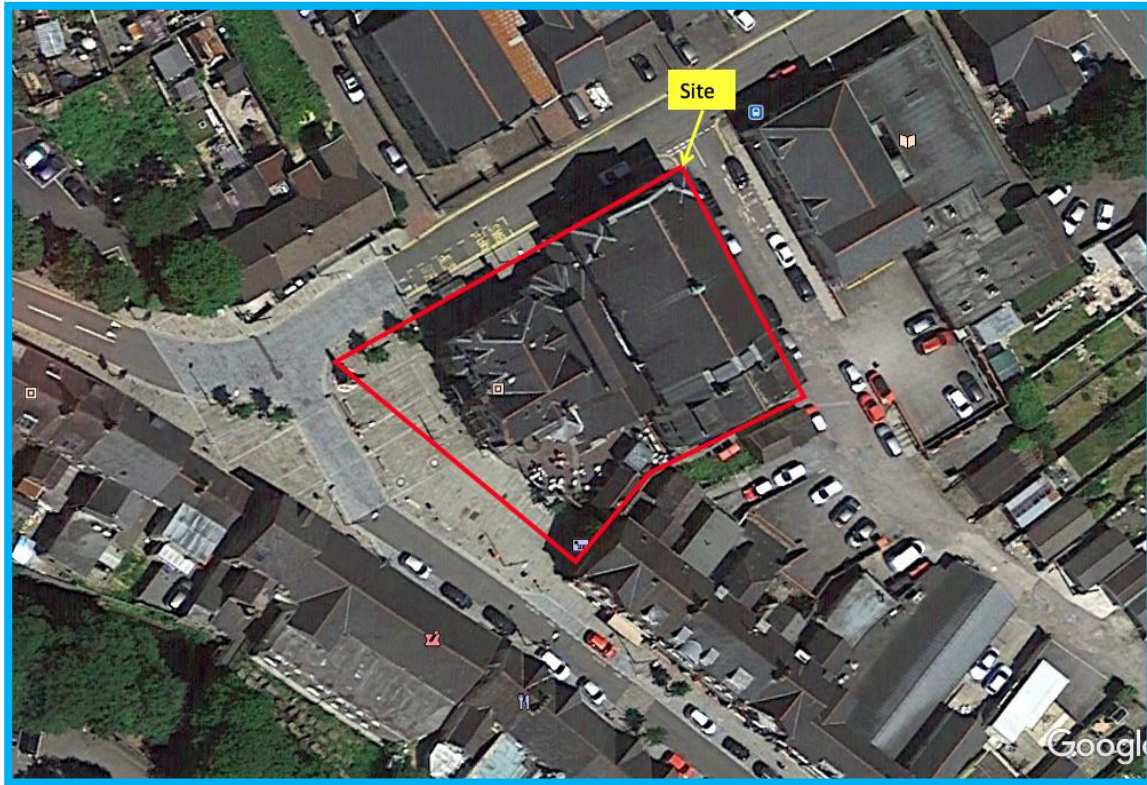


Fig 3 Satellite view of Arts Centre site (Google Earth).

- 3.1.3 A detailed topographic survey including utilities has been undertaken and shows the existing Arts centre with a finished floor level of 33.05m AOD and the external public space generally at 32.8m AOD.

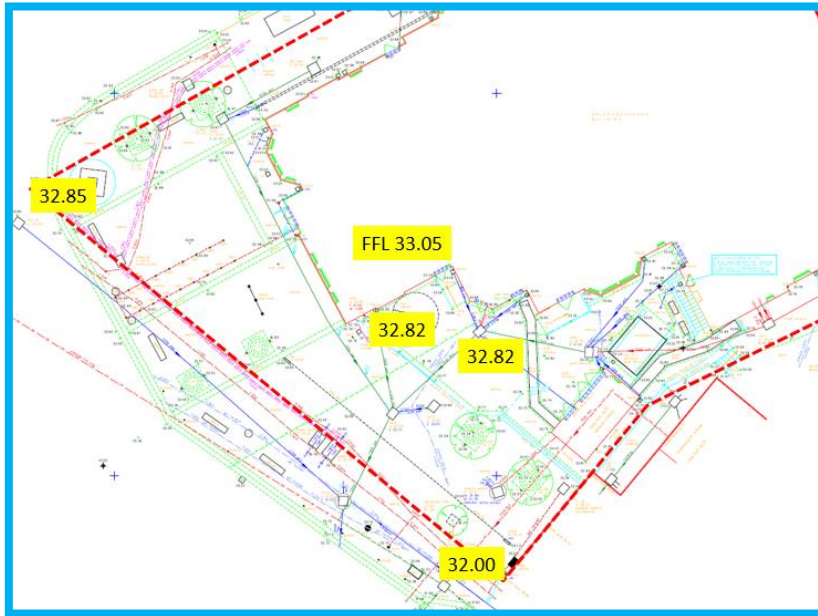


Fig 4 Annotated topographic survey with levels related to Ordnance Datum (Midland Survey Ltd)

4.0 Proposed Development

- 4.1.1 The proposed development comprises a cinema, toilets and break out space/foyer. The reason for the proposal is to improve the welfare facilities and meet the requirements of the Disabled Discrimination Act. The existing cinema will be changed into breakout space. The remaining areas will remain much as existing.
- 4.1.2 The improvements may increase attendance, but this is not the main reason for the proposals.
- 4.1.3 The proposed floor level matches the existing Arts Centre level of 33.05m AOD for accessibility reasons.

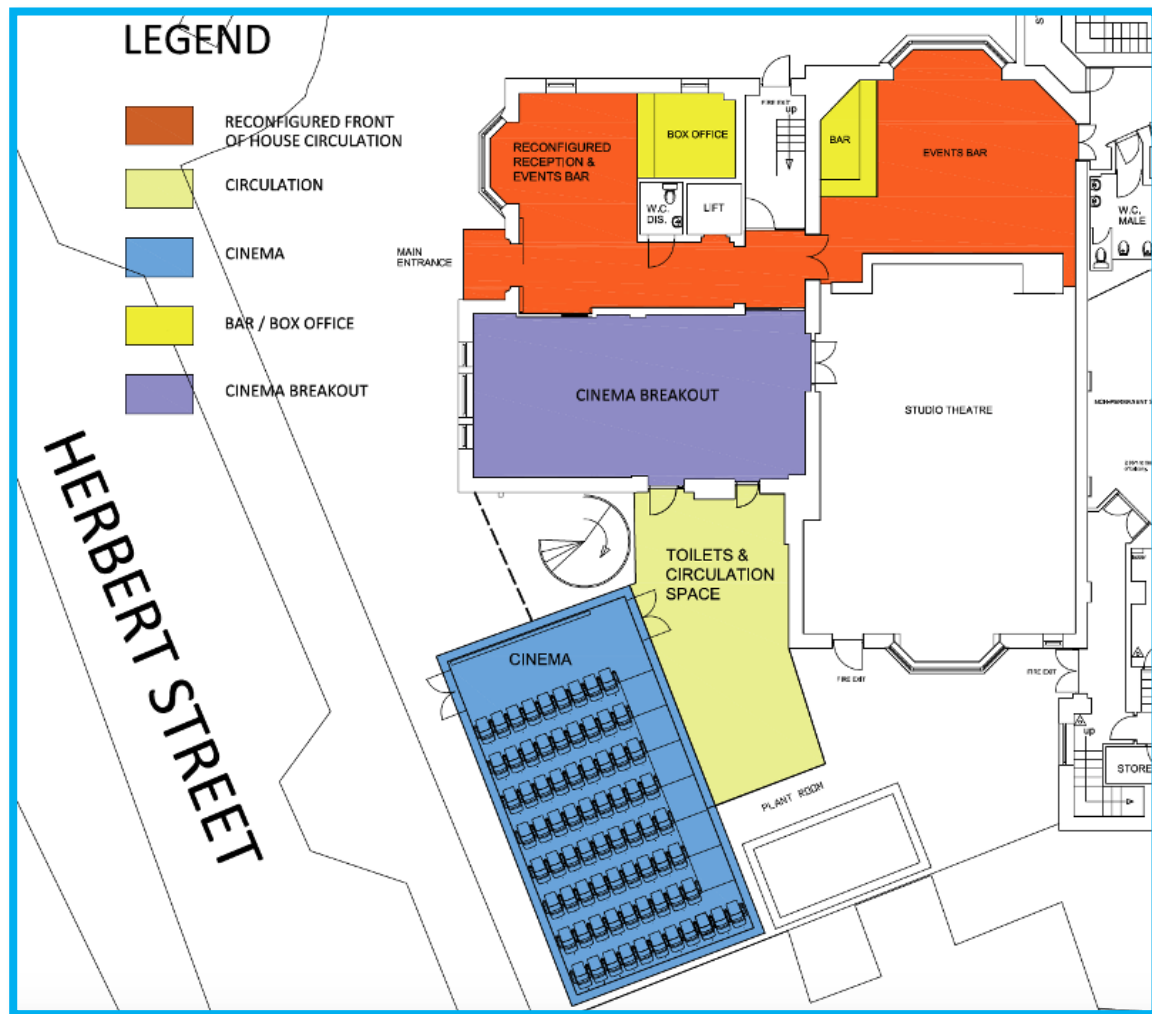


Fig 5 Proposed general layout showing blue cinema and green toilets and circulation space in context of existing site in purple, orange and lime.

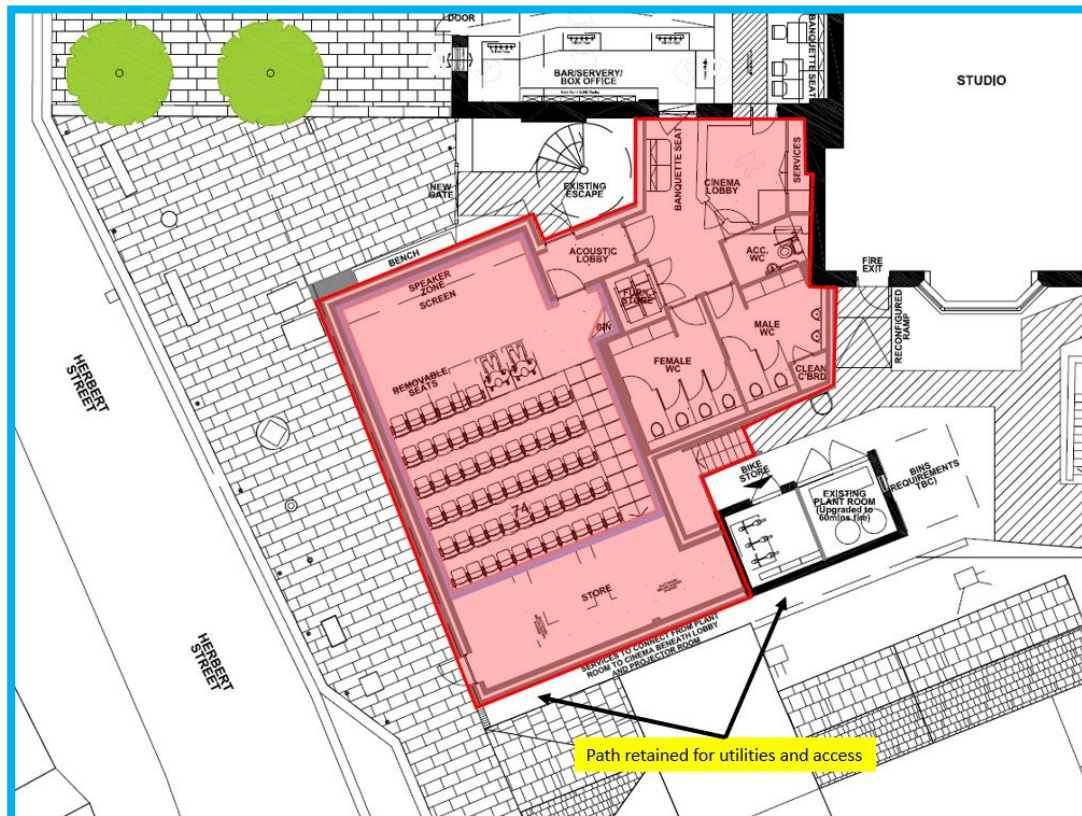


Fig 6 Detailed plan of proposal in red outline and shading, abutting main art centre, but with pathway gap to existing buildings boundary to the south.

5.0 Flood Risk

- 5.1.1 According to the TAN 15 Development Advice Map the site is within Flood Zone C1, which is within a flood plain served by significant infrastructure, including flood defences.
- 5.1.2 NRW supplied Product 5 and 6 data in December 2020 (Ref: ATI 20418a) which has been used to assess the mechanism of flooding and predicted potential flood levels for a range of return periods.
- 5.1.3 The source of the flooding is from the River Tawe, which is approximately 290m southeast of the site. As more extreme flood events occur it appears that water gathered and conveyed by the disused canal and the Upper Clydach River join the floodwaters before the site begins to become affected.
- 5.1.4 The NRW Flood Map for Planning shows the site to be in Flood Zone 3, and partly in Flood Zone 2.

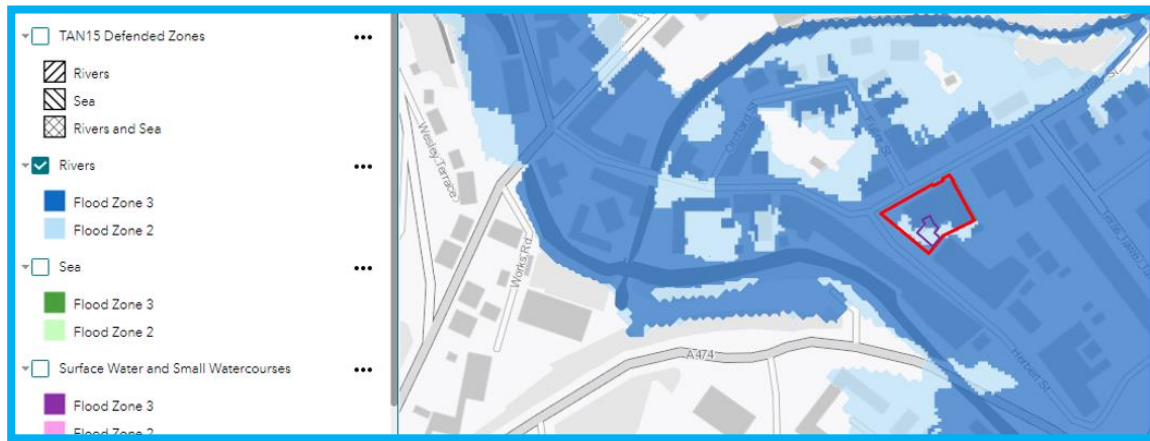


Fig 7 Site shown in red, with proposed development in purple, superimposed on the NRW Flood Map for Planning, showing the development area to be in Flood Zones 2 and 3.

5.1.5 The following maps show the predicted flooding from Product 5 and 6 data for different return periods.

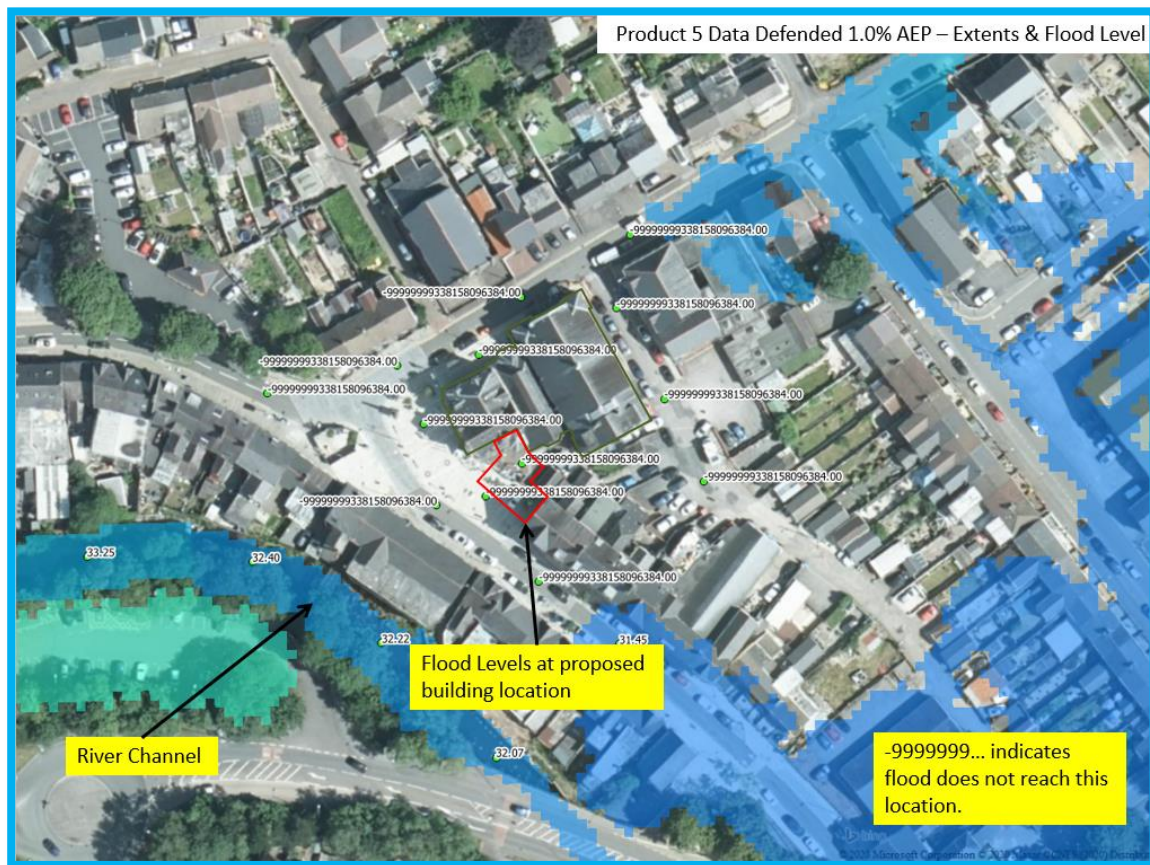


Fig 8 1% AEP event shows no flood risk at the site



Fig 9 1% AEP + 20% climate change allowance event shows no flood risk at the site. The flood level is approximately 500mm below the existing floor level



Fig 10 0.5% AEP event shows no flood risk at the site – 600mm below FFL



Fig 11 0.1% AEP event shows 1.4m depth of flooding at the site

5.2 Design Flood Event

- 5.2.1 Referring to the latest NRW climate change guidance, September 2021, the design flood event for Less Vulnerable development (the relevant category for this development) would be the 1 in 100 year event with 25% allowance for climate change.
- 5.2.2 From Fig 9 and interpolation the flood level in the 1 in 100 + 20% event in the vicinity of the site would be about 32.25m AOD. Therefore by linear interpolation in the 1 in 100 + 25% climate change event would be about 32.45m AOD. This is a precautionary approach as it does not allow for the spreading of the flood as the depth gets greater.

September 2021

Table 1: peak river flow allowances by river basin district (using 1961 to 1990 baseline¹)

	Total potential change anticipated by the 2020s	Total potential change anticipated by the 2050s	Total potential change anticipated by the 2080s
Severn			
Upper end estimate	25%	40%	70%
Change factor /central estimate	10%	20%	25%
Lower end estimate	0%	5%	5%

Fig 12 River basin district climate change allowance form September 2021 guidance.

5.2.3 The 1 in 1000 year predicted flood level is shown in Fig 11 at 34.4m AOD

5.3 Surface Water Flood Risk

5.3.1 Surface water flooding has been considered and this shows that the site is at very low risk of surface water flooding.

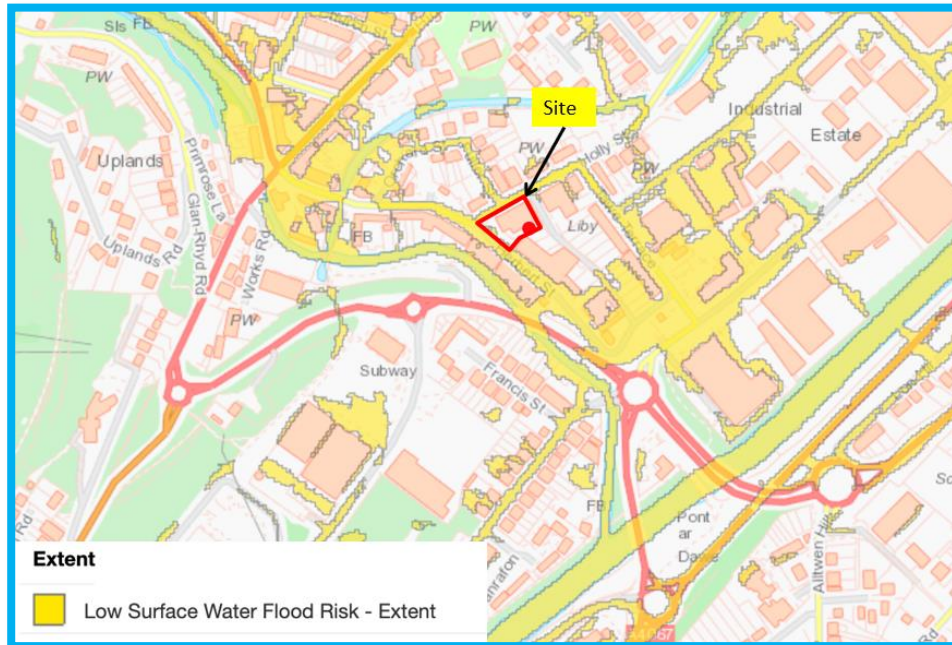


Fig 13 NRW Risk of flooding from Surface Water and Small Watercourses. The site of the building is shown to be at very low risk.

5.4 Other Sources of Flooding

5.4.1 As the site is on a fall, sewer flooding would lead away from the building to the east along Herbert Road.

5.4.2 The site is not vulnerable to groundwater flooding by observations and the character of the area; groundwater levels would be closely linked to the river levels which are below the level of the site.

5.5 Historic Flood Events

5.5.1 The site is shown to be on the edge of the record of historic flooded area, partly in the area and partly outside the area, suggesting a very shallow flood which is unlikely to have affected the inside of the building, given that the floor level is raised above the external levels.

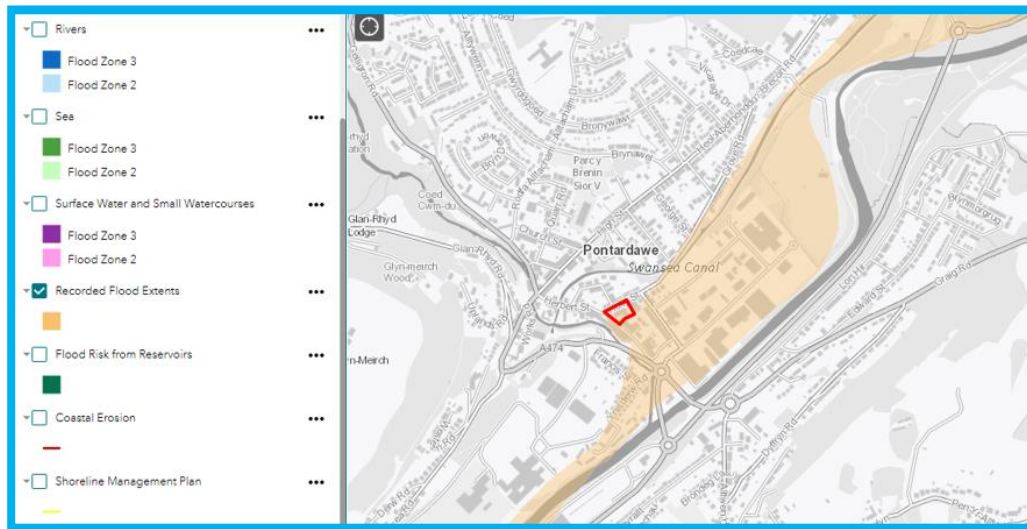


Fig 14 NRW map showing historic flooding

5.6 Mechanism of Flooding

5.6.1 The character of the flooding is that the levels rise from the River Tawey and then disperse into the flood plain. From the above maps the site is not on a 'flow path' – it is a rising and merging of flood water in the area. On the wider area of the Flood Map for Planning, it can be seen that the site is at the edge of the flood plain of the River Tawey, confirming the velocities will be very low.

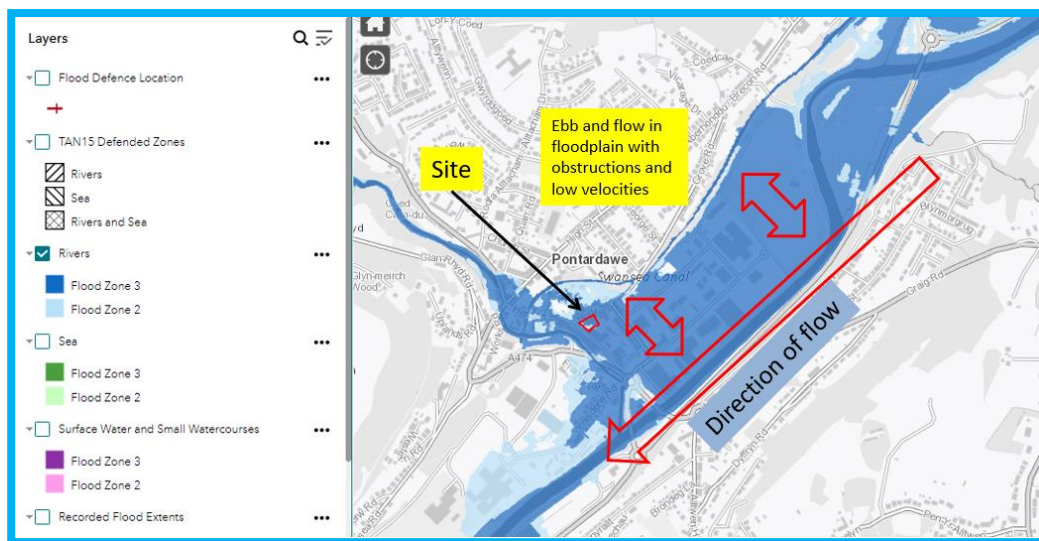


Fig 15 Plan showing site at edge of floodplain in an area of low velocity.

6.0 Summary of Levels

- 6.1.1 The Table below shows a summary of the levels, highlighting the Design Flood Level (DFL) and levels at which flood compensation would apply and flood resilience is applied.

Location	Levels
Site Levels – Existing	
Site level	32.8m AOD
Floor level	33.05m AOD
Site Levels – Proposed	
Ground floor level (ie retained floor level)	33.05m AOD
NRW Products 5 & 6 predicted flood levels	
1 in 100 year current day defended (Fig 8)	31.45m AOD
1 in 100 year with 20% climate change allowance (Fig 9)	32.25m AOD
1 in 100 year with 25% climate change allowance (DFL)	32.45m AOD
DFL + 600mm	33.05m AOD
Flood Compensation level	32.45m AOD
1 in 200 year current day flood level	32.22m AOD
1 in 1000 current day flood level	34.44m AOD
Recommended structural flood resilience level	34.50m AOD

7.0 Safety of People

- 7.1.1 The safety of occupants at the Arts Centre has been considered in a structured manner and a staged approach is proposed.
- 7.1.2 The management will designate a responsible manager and deputy who will be responsible for implementing an agreed detailed Flood Plan. The Flood Plan will be based on the following structured approach, and will apply to the whole building, not just the parts subject to the application.
- 7.1.3 The Flood Plan will follow the guidance for a community Flood Plan on the NRW website <https://cdn.cyfoethnaturiol.cymru/media/3601/community-flood-plan.pdf>
- 7.1.4 The management will register with the NRW flood warning service.
- 7.1.5 If serious weather is predicted, or a warning of bad weather issued, the venue will be closed for the safety of people travelling etc, thus avoiding the risk to people at the site.
- 7.1.6 If there is a warning issued by NRW, the site will be evacuated prior to flooding commencing (ie prior to out of bank flooding).
- 7.1.7 If flooding has commenced, there will be news and social media messages broadcast and the management will hear/be informed and the building evacuated.
- 7.1.8 If water is seen approaching, the management will evacuate the building.

- 7.1.9 If flood water has approached the building, it is suggested that occupants move to the first floor of the building where there are essential services such as a management structure, shelter, toilets and water. Particular provisions will be made for disabled.
- 7.1.10 There is a dry area in the public car park with toilets some 70m northwest of the Arts Centre, but this has the risk of becoming a ‘dry island’ and not preferred.



Fig 16 Access to dry island in 1 in 1000 year event, with public lavatories

- 7.1.11 There are no features which could obstruct the flow of water or create localised difficulties – in fact the shared space highlights the low risk of trips in the area if flooding is shallow.

8.0 Flood Compensation

- 8.1.1 Flood storage has been considered to ensure no loss of floodplain storage in the 1 in 100 year event with 25% climate change allowance (ie Design Flood Level), which is 32.45m AOD.
- 8.1.2 The 32.45m contour has been traced on the topographic survey to inform the area which requires level for level flood compensation.
- 8.1.3 This contour has then been added to the design layout to inform the area of flood compensation void required on the site.
- 8.1.4 The lowest ground level within the development footprint is 32.0m AOD.
- 8.1.5 The flood compensation void is therefore designed with a base at 32.0m AOD (and nominal 1 in 100 rise to the rear) and a roof level of 32.66m AOD, which is above the 32.45 DFL.

8.1.6 The flood compensation void is therefore shown to accommodate the flood water level for level and volume for volume – and provide additional volume as a precautionary measure.

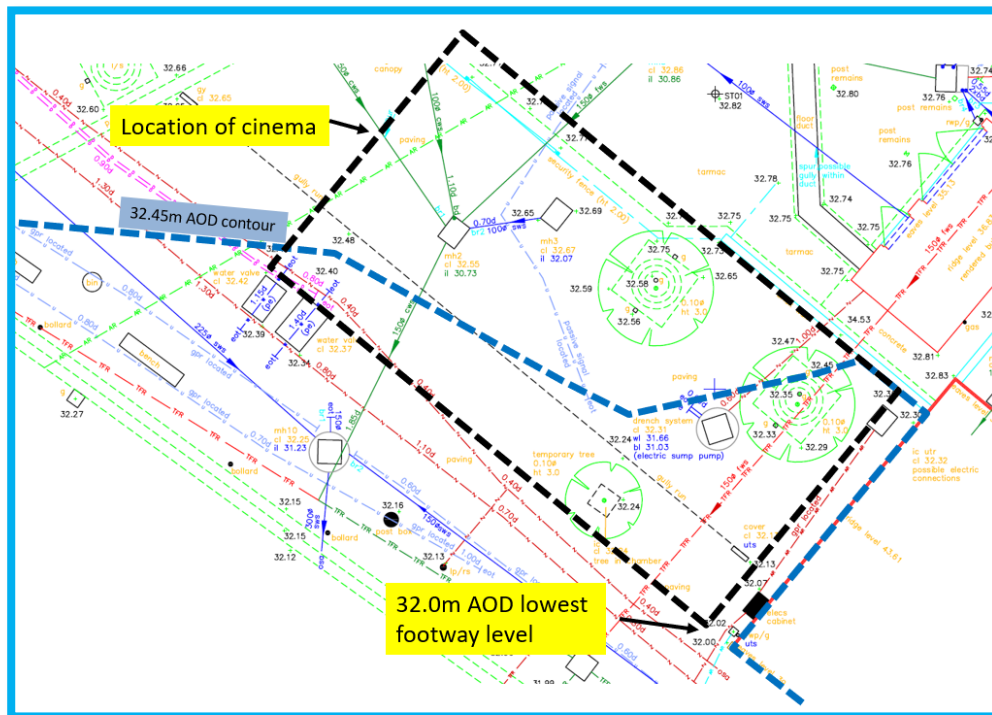


Fig 17 32.45m AOD contour added to topographic survey, with cinema location and lowest footway level.

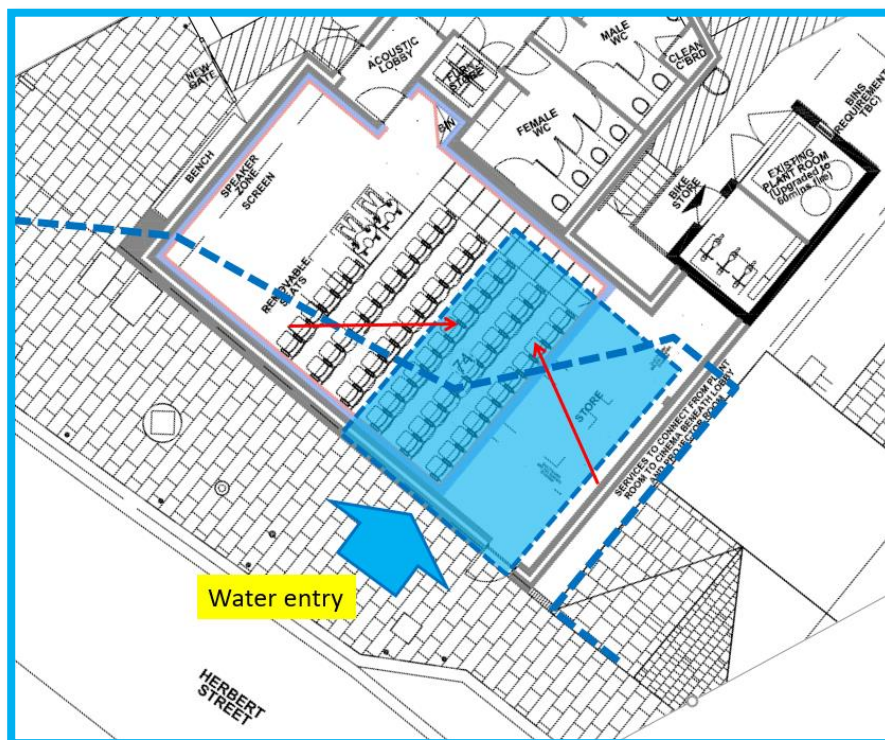


Fig 18 32.45m AOD contour translated onto the ground floor layout, showing the flood compensation void with access from the public area, protected by a grill.

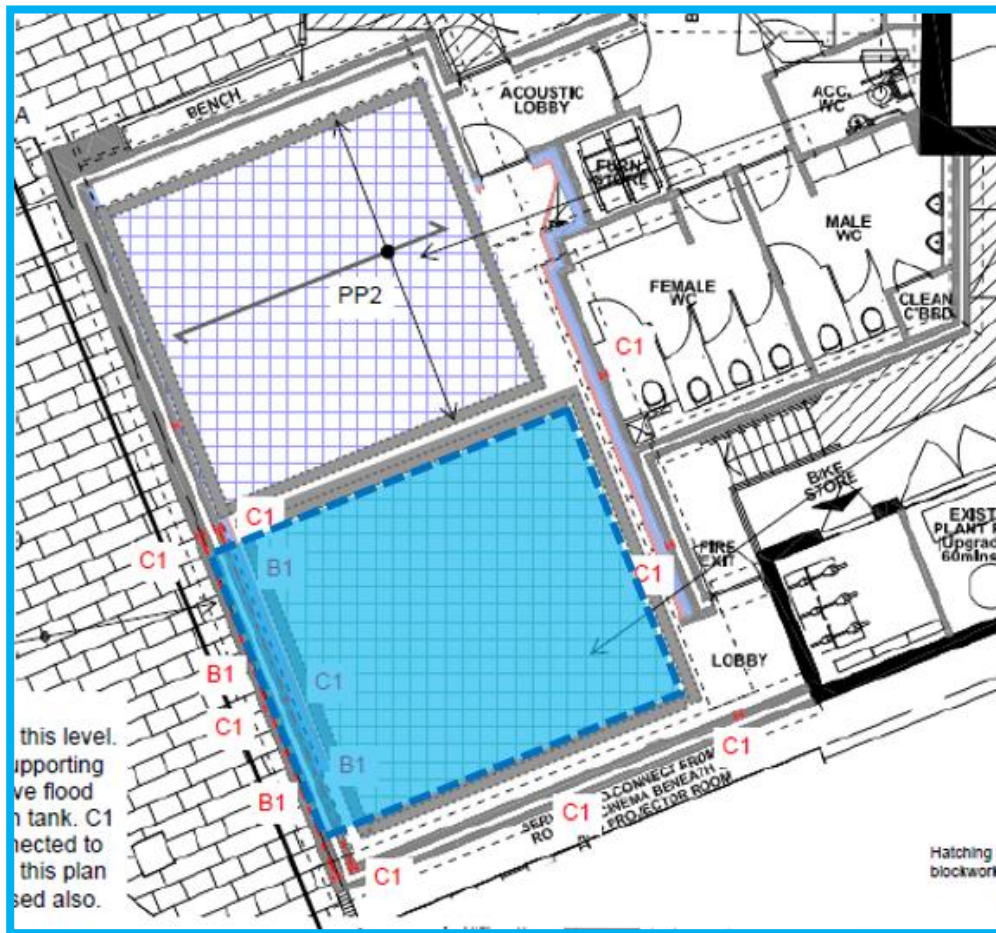


Fig 19 Plan showing structural drawing of flood compensation void in blue (KB2)

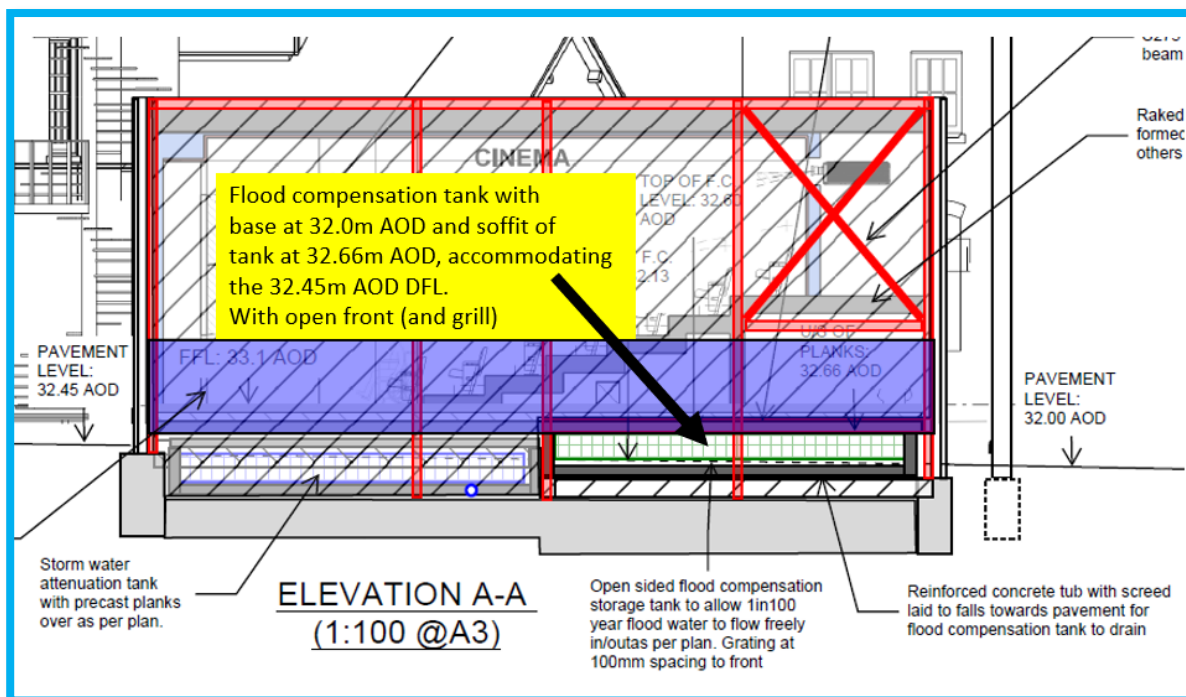


Fig 20 Structural cross-section showing location of flood compensation void with base at 32.0m AOD and roof at 33.66m AOD to accommodate flood water, with open grill facing public area.

- 8.1.7 A structured approach has therefore been adopted to ensuring that flood water will not be displaced in the Design Flood Event, and indeed the proposed void will provide more flood storage for the more frequent events.
- 8.1.8 The void will be protected by grills, is designed to allow easy inspection and maintenance, but prevent access for unauthorised use or any storage.
- 8.1.9 An appropriate maintenance programme will be implemented.

9.0 Justifying the Development

- 9.1.1 Referring to TAN 15 Section 6, and Paragraph 6.1 below applies directly to the proposed improvements associated with the Arts Centre. The proposal will not be free from flood risk but will not exacerbate flooding, as described above.
- 9.1.2 The cinema will improve facilities and provide modern requirements for welfare and DDA accessibility in an important cultural facility for Pontardawe and the local area.
- 9.1.3 The welfare and cinema improvements are inherently linked with the Pontardawe Arts Centre
- 9.1.4 The location is previously developed land – it is a public square in the centre of the town.
- 9.1.5 This FCA shows that the potential consequences of flooding for the particular type of development (public building) are acceptable and in accordance with principles described in Paragraph 6.1.

6.1 Much urban development in Wales has taken place alongside rivers and in the coastal plain. It is therefore inevitable, despite the overall aim to avoid flood risk areas, that some existing development will be vulnerable to flooding and fall within zone C. Some flexibility is necessary to enable the risks of flooding to be addressed whilst recognising the negative economic and social consequences if policy were to preclude investment in existing urban areas, and the benefits of reusing previously developed land. Further development in such areas, whilst possibly benefiting from some protection, will not be free from risk and could in some cases exacerbate the consequences of a flood event for existing development and therefore a balanced judgement is required.

Fig 21 Paragraph 6.1 from TAN 15

10.0 Flood Mitigation

- 10.1.1 Referring to Section A1.14 of TAN 15 the type of development falls into the category Commercial/Retail and is designed to be flood free in the 1% fluvial event with climate change allowance (the floor level is 600mm above the DFL) (ie the threshold event) The proposal is therefore compliant.

- 10.1.2 Referring to Section A1.15 of TAN 15, the site is considered to be in the category Commercial and Residential.
- 10.1.3 The maximum depth of flooding in the 0.1% event is given as 600mm in the Table below. The depth of flooding at the existing Arts Centre is predicted to be 1.4m in the 0.1% event, and this will remain the situation bearing in mind the need to meet accessibility requirements and retain the same floor level.
- 10.1.4 Given that the Arts Centre will be responsibly managed, the proposed Flood Plan will ensure that the occupants will be safe in the event of flooding, with a managed safe refuge on the upper floors in the last resort.
- 10.1.5 The proposed resilience measures will ensure that the proposed works are safe and will be capable of being brought back into use soon after flooding.
- 10.1.6 The mechanism of the flood described above shows that the rise in flood water will be relatively slow, and is not predicted to exceed 0.3m rise/hour.
- 10.1.7 The speed of inundation predicted from the main sources of flooding will give much more time than 2 hours prior to flooding reaching the site.
- 10.1.8 The site has been shown to be outside the pathway of waters and in an area of 'flood storage' – the velocities are therefore predicted to be very low, and below 0.15m/s.

Type of development	Maximum depth of flooding (mm)	Maximum rate of rise of floodwaters (m/hr)	Maximum speed of inundation of flood risk area (hrs)	Maximum velocity of floodwaters (metres/sec)
	Property Access			Property Access
Residential (habitable rooms)	600 600	0.1	4	0.15 0.3
Commercial & Retail	600 600	0.3	2	0.15 0.3
Industrial	1000 1000	0.3	2	0.3 0.45
Emergency Services	450 600	0.1	4	0.15 0.3
General Infrastructure	600 600	0.3	2	0.3 0.3

NOTE. The above figures are indicative and reflect conditions in which, given the presence of adequate warnings and preparation, appropriately equipped personnel could undertake emergency activities. However they are not definitive. Each site must therefore be considered individually and a judgement taken in the context of the particular circumstances which could prevail at that site.

Fig 22 Table from Paragraph A1.15 of TAN 15

11.0 Conclusions and Recommendations

- 11.1.1 Pontardawe Arts Centre proposes improvements to meet modern welfare and DDA accessibility requirements which involve an extension with toilets, circulation and cinema space.
- 11.1.2 The proposals are located on an open paved space in the town centre attached to the existing Arts Centre.
- 11.1.3 The existing floor and proposed floor is shown to be 600mm above the Design Flood Level (DFL) (ie the 1% flood level with appropriate climate change allowance for the lifetime of the development, 100 years).
- 11.1.4 Safe dry access is available in the Design Flood Event.
- 11.1.5 The 0.1% predicted flood would result in 1.4m of flood water in the existing and proposed Arts Centre, bearing in mind the ground floor needs to be level throughout for DDA requirements.
- 11.1.6 The Flood would be at low velocity due to the location in the flood plain.
- 11.1.7 A structured approach to safety of people in the 0.1% event is described, which highlights that as a public building it will be responsibly managed and closed if hazardous weather is predicted.
- 11.1.8 A Flood Plan will be prepared which will be implemented by the Management.
- 11.1.9 The proposal will reduce flood risk off site due to the proposed flood compensation void incorporated into the building design, with appropriate grills and facilities for inspection.
- 11.1.10 The structure will be resilient up to the 0.1% level to allow a swift return to operation following a flood.
- 11.1.11 The proposals satisfy an important need for the community, are shown to be safe for all occupants for the lifetime of the building, will result in more sustainable building due to resilient construction, do not make flood risk worse elsewhere and comply with the policies stated in TAN15.