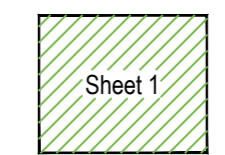


KEY PLAN:



GENERAL NOTES:

**Utility Detection:** This drawing is a record of the utility detection carried out on 11/08/2023. It is not a plan of the utility network and should not be used as such. The location of any utility is shown as an indication only and should not be used as a guide for excavation. The location of any utility is shown as an indication only and should not be used as a guide for excavation.

**Method Used:** The utility detection was carried out using a combination of the following methods: GPR, EML, QLD, and other non-invasive methods.

**Accuracy:** The accuracy of the utility detection is dependent on the quality of the data and the skill of the operator. The accuracy of the utility detection is dependent on the quality of the data and the skill of the operator.

**Assumptions:** The utility detection was carried out on the assumption that the utility network is as shown on the plan. It is assumed that the utility network is as shown on the plan.

**Warnings:** The utility detection was carried out on the assumption that the utility network is as shown on the plan. It is assumed that the utility network is as shown on the plan.

**Service Records:** The utility detection was carried out on the assumption that the utility network is as shown on the plan. It is assumed that the utility network is as shown on the plan.

**Abbreviations:** The utility detection was carried out on the assumption that the utility network is as shown on the plan. It is assumed that the utility network is as shown on the plan.

**Survey and Datum Information:** The utility detection was carried out on the assumption that the utility network is as shown on the plan. It is assumed that the utility network is as shown on the plan.

**Utility Notes:** The utility detection was carried out on the assumption that the utility network is as shown on the plan. It is assumed that the utility network is as shown on the plan.

LEGEND:

- Utility Assets:
  - Electricity: CATV, Electric, Gas, Sewer, Stormwater, Water
  - Other: Cable, Duct, Manhole, Vault, Chamber, Box, etc.
- Topographic Features:
  - Contours: 1m, 2m, 5m, 10m, 20m, 50m, 100m, 200m, 500m, 1000m
  - Other: Fences, Walls, Roads, Paths, etc.
- Other Symbols:
  - HAZID: Hazardous Area
  - QLD: Utility Location
  - GPR: Ground Penetrating Radar
  - EML: Electromagnetic Location
  - Area not surveyed
  - Number of subsurveys



Number	Description
Haz ID 1	As we were unable to trace this URF detection to a source we cannot confirm what it is so dig with caution in this area.
Haz ID 2	Records indicate a water main in this location as we were unable to locate these with EML or GPR they are shown as QLD, dig with caution in this area.
Haz ID 3	Records indicate an Abandoned water main in this location as we were unable to locate these with EML or GPR they are shown as QLD, dig with caution in this area.
Haz ID 4	We were unable to trace these empty ducts beyond this point with EML or GPR so dig with caution in this area
Haz ID 5	Records indicate Electric cables in this approximate location. We were unable to locate these with EML or GPR, dig with caution in this area.
Haz ID 6	Records indicate a Gas main in this location as we were unable to locate these with EML or GPR they are shown as QLD, dig with caution in this area.

**DESKTOP UTILITY RECORDS**

Utility Type	Provider Details	Date Acquired
Gas	Hedge Poles, Wires and Pipes	16/06/2020
Water - Sewers	Wash water	16/06/2020
Electric	SSE, Western Power	16/06/2020
BT	Openreach	16/06/2020

**1. Warning:** Water and Gas utilities to individual properties are often of a size not covered by standard GPR, EML, or GPR investigation. Whenever possible, the roads have been marked from surface evidence (pipe covers, valves, etc), but this should be viewed as a guide only. Careful digging techniques should be used at all times, in line with the requirements of BS5400 and current COMI regulations.

**2. Warning:** Assumed Route positions are indicative only and are in an approximate position. Safe digging practices in accordance with HSE(G47) must be used to verify the information and establish their actual position.

**3. Warning:** Records information and positions are indicative only and are in an approximate position. Safe digging practices in accordance with HSE(G47) must be used to verify the information and establish their actual position.

**4. GPR Warning:** GPR or post-hoc methods with GPR indicate a possible utility or feature underground that we have not been able to identify fully. It is shown to the client's discretion if they wish to do any further investigation to determine if these features will affect their project. The target was shown over not be complete in the route it takes or its size/dimension due to ground conditions affecting the quality of GPR data.

SURVEY AND DATUM INFORMATION:

Pseudo Distance Survey plane grid tied to National Grid via GPS observations at survey control point STN01. Bearing S7N01 to S7N02, 102° 44' 18"

Survey control as indicated:

Name	Easting	Northing	Height
STN01	31238.832	107428.863	8.807
STN02	31238.877	107428.124	8.837
STN03	31240.555	107428.102	8.857

UTILITY NOTES:

Services shown outside the survey boundary are for information only and may not be complete. If information is required outside our survey boundary, please contact a Technics Project Manager.

**No New records were cross referenced with this drawing**

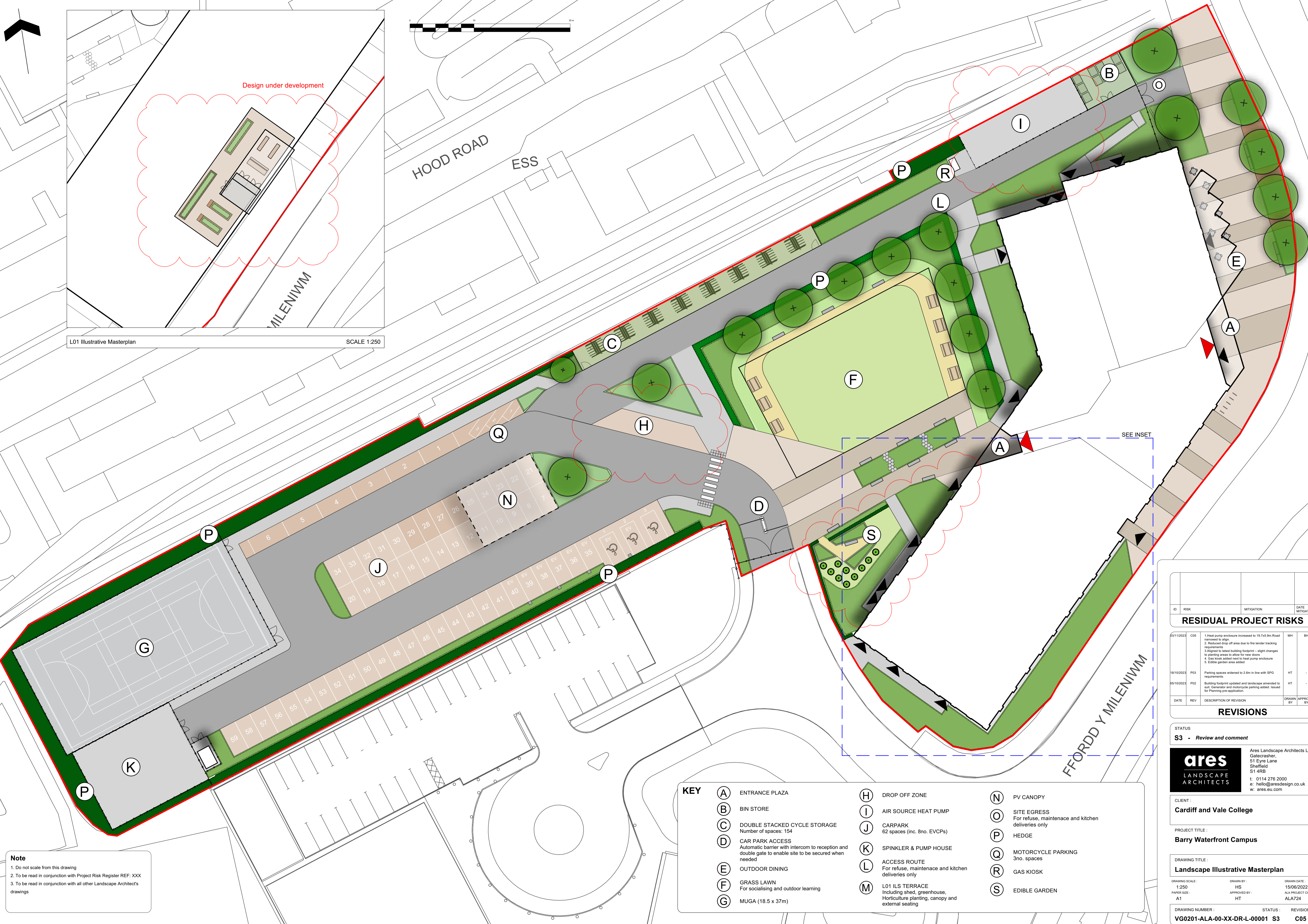
Rev.	Date	Revision	By	Checked
A	20/09/2023	Final Issue		LW

DO NOT SCALE!

Client:	HSP
Project:	Flord Y Milenium Bary CF62 5AT
Survey Quality:	Topographical and QLTB" Utility Survey
Start Date of Survey:	29/08/2023
Drawing Status:	Final
Original Size:	A0
Scale:	1:200
Sheet:	1 of 1
Drawing No.:	SP231068-0923-01
Revision:	A

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## B Development Plans



L01 Illustrative Masterplan SCALE 1:250

**Note**  
 1. Do not scale from this drawing  
 2. To be read in conjunction with Project Risk Register REF: XXX  
 3. To be read in conjunction with all other Landscape Architect's drawings

KEY					
(A)	ENTRANCE PLAZA	(H)	DROP OFF ZONE	(N)	PV CANOPY
(B)	BIN STORE	(I)	AIR SOURCE HEAT PUMP	(O)	SITE EGRESS
(C)	DOUBLE STACKED CYCLE STORAGE Number of spaces: 154	(J)	CARPARK 62 spaces (inc. 8no. EVCPs)	(P)	HEDGE
(D)	CAR PARK ACCESS Automatic barrier with intercom to reception and double gate to enable site to be secured when needed	(K)	SPINKLER & PUMP HOUSE	(Q)	MOTORCYCLE PARKING 3no. spaces
(E)	OUTDOOR DINING	(L)	ACCESS ROUTE For refuse, maintenance and kitchen deliveries only	(R)	GAS KIOSK
(F)	GRASS LAWN For socialising and outdoor learning	(M)	L01 ILS TERRACE Including shed, greenhouse, horticulture planting, canopy and external seating	(S)	EDIBLE GARDEN
(G)	MUGA (18.5 x 37m)				

ID	RISK	MITIGATION	DATE MITIGATED
<b>RESIDUAL PROJECT RISKS</b>			
03/11/2023	C05	1. Heat pump enclosure increased to 10.7x5.5m (Road narrowed to align) 2. Reduced drop off area due to fire tender tracking requirements 3. Aligned to latest building footprint - slight changes to planting areas to allow for new doors 4. Gas kiosk added next to heat pump enclosure 5. Edible garden area added	MH BH
18/10/2023	P03	Parking spaces widened to 2.6m in line with SPG requirements	HT
05/10/2023	P02	Building footprint updated and landscaping amended to suit. Generator and motorcycle parking added. Issued for Planning pre-application.	HT

DATE	REV	DESCRIPTION OF REVISION	DRAWN BY	APPROVED BY
<b>REVISIONS</b>				

**STATUS**  
**S3 - Review and comment**

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CLIENT:  
**Cardiff and Vale College**

PROJECT TITLE:  
**Barry Waterfront Campus**

DRAWING TITLE:  
**Landscape Illustrative Masterplan**

DRAWING SCALE: 1:250  
 PAPER SIZE: A1

DRAWN BY: HS  
 APPROVED BY: HT

DATE: 15/06/2022  
 ALA PROJECT CODE: ALAT24

DRAWING NUMBER: VG0201-ALA-00-XX-DR-L-00001  
 STATUS: S3  
 REVISION: C05

## C Flood Modelling Technical Note

## NOTE TO FILE

JBA Project Code	2023s1371
Contract	Ffordd y Mileniwm - Modelling & FCA
Client	WEPCo Ltd
Day, Date and Time	23 October 2023
Author	Samuel Rowley BSc
Reviewer / Sign-off	Paul Redbourne BSc PGCert, MCIWEM, C.WEM
Subject	Flood Modelling Technical Note

## 1 Introduction

### 1.1 Project Requirements

JBA Consulting have been commissioned by Welsh Education Partnership Company Limited (WEPCo Ltd) to produce a Flood Consequences Assessment (FCA) for a new college development at Ffordd y Mileniwm, Barry. The project has involved a detailed flood modelling exercise to provide an improved understanding of tidal flood risk.

The Natural Resources Wales (NRW) product 7 Cadoxton Tidal Inundation model has been licensed for this study. JBA Consulting completed comprehensive updates of this model in 2017 and 2020 and it was submitted to NRW to inform a Flood Map Challenge of the area which was accepted.

This technical note has been produced to summarise the flood modelling work completed, outlining the updates applied to the existing model, and any assumptions and limitations associated with the model outputs. This technical note does not include analysis of the model results as this has been included within the FCA report.

The site is located at the Barry Docks in Barry shown in Figure 1-1.



**Figure 1-1 Site location**

## NOTE TO FILE

JBA Project Code	2023s1371
Contract	Ffordd y Mileniwm - Modelling & FCA
Client	WEPCo Ltd
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Subject	Flood Modelling Technical Note

## 2 Model Approach

Following the submission of the Flood Map Challenge, NRW undertook a series of updates to the model prior to the publication of the flood mapping products. These updates included the addition of the latest available LIDAR data, amendments to the 2D domain to prevent glass walling, updates to the tidal boundary to align with the amended 2D domain and the inclusion of sweetener flows to the 1D watercourses.

A review of this model confirmed that it is suitable for the assessment of tidal flood risk on the site specific-scale for the Ffordd y Mileniwm site. However, the model review identified a series of updates to make use of best available data and align with current best practice. This section of the report summarises the updates applied to the NRW model to produce a new baseline model scenario.

### 2.1 General Schematisation

The new flood model utilised the latest TUFLOW executable release of 2023-03-AB. This is considered an improvement on the previous modelling that had adopted the TUFLOW executable 2020-10-AD. The 2023-03-AB release includes a bug issue that incorrectly maps in channel results due to a water level line problem. This is not considered a concern for this study as the model has been used to focus on tidal flood risk rather than a fluvial assessment.

### 2.2 Tidal Boundary Conditions

The updates NRW applied to the model prior to the publication of the new flood mapping products included amendments to the tidal boundary conditions. This focused on present day and 100-years of climate change. For the assessment of the proposed college site, a design life of 75-years is appropriate and therefore a new set of tidal boundary conditions needed generating for the 2098 epoch.

In line with Welsh Government guidance, the UKCP18 User Interface<sup>1</sup> has been used to generate sea level rise estimates to account for 75-years of climate change using the RCP8.5, 70th percentile dataset. Analysis of the existing NRW model shows that a base year of 2017 has been used and therefore an increase of 0.75m has been applied to uplift the boundary conditions from a present-day scenario to the 2098 epoch.

The existing model results show that the college site is flood free in the 2121 0.5% AEP event and therefore, the new flood modelling has focused solely on the 2098 0.1% AEP event. The maximum extreme water level for this event is shown in Table 2-1.

**Table 2-1: Tidal boundary extreme sea levels (mAOD)**

	T1000
2098	8.59

<sup>1</sup> UK Climate Projections User Interface. <https://ukclimateprojections-ui.metoffice.gov.uk/ui/home>

## NOTE TO FILE

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Contract	Ffordd y Mileniwm - Modelling & FCA
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Subject	Flood Modelling Technical Note

## 3 Model Runs

### 3.1 Baseline model scenario

Run reference	Baseline - CADX_TIDAL_DEF_~e1~_061
Purpose of runs:	To model 0.1% AEP event plus climate change for 2098 epoch (75-year design life as non-residential site)
TUFLOW file names:	CADX_TIDAL_DEF_~e1~_061.tcf CADX_TIDAL_DEF_~e1~_061.ecf CADX_TIDAL_5m_050.tgc CADX_TIDAL_047.tbc
Run time:	Simulation time: 45 hours
AEP events:	0.1% AEP plus climate change (2098)
Boundary conditions:	bc_dbase_CADX_TIDAL_061.csv
Run settings:	TUFLOW version: 2023-03-AB-iSP-w64

## 4 Model performance, assumptions, and limitations

The ME% for the 0.1% AEP event for the baseline scenario is inside the typically recommended +/-1% range, which indicates that the model can be considered stable.

The model experiences 283 1D and 16 2D negative depths. The 1D negative depths occur around model node EAST\_0150 and CADX\_0082U; these are from the pre-existing model. These 1D negative depths occur significant distances away from the site, happen for relatively short periods, and do not align with the timing of the maximum water level and are therefore not considered to have any impact on the predicted maximum water levels around the site in this design event.

The 2D negative depths are also from the pre-existing model. These occur approximately between 15-15.25 hours, at a location at the edge of the dock where there is sharp change in elevation between ground levels and water levels within the dock basin close to the tidal boundary condition. The negative depths occur as 2D water levels are rising within the dock and reach a similar level to those applied from the downstream boundary and cause some localised anomalies in water depths. Peak water levels within this part of the model, and around the development site, in the 0.1% AEP event occur later at around 16 hours after water levels within the dock have equalised. Peak Mass Balance error across the whole simulation is within acceptable limits indicating that any impact on water volumes that result from this localised instability are very minor. It is therefore considered that this short period of 2D instability does not have any significant impact on predicted maximum water levels around the development site for the modelled event.

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ISO 45001:2018

