

Harbour Avenue, Camel's Head

SAS Harbour Avenue Limited

Flood Risk Assessment





Harbour Avenue, Camel's Head

Flood Risk Assessment

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|----------------|--|
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| Checked by | J Blyth |
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1 Introduction

- 1.1 Awcock Ward Partnership (AWP) has been commissioned by SAS Harbour Avenue Limited to prepare a Flood Risk Assessment (FRA) in support of a full planning application for a change of use of buildings and land at Harbour Avenue, Camel's Head, Plymouth. The change of use is for self-storage, commercial storage, indoor vehicle storage, commercial distribution, a recreational sports area, and office use.
- 1.2 The site is located in the west of the city of Plymouth, and is situated just north of Weston Mill Lake. The 6-figure grid reference of the site location is SX450574.
- 1.3 The location of the proposed development is shown on Figure 1.1 below.

Figure 1.1 - Site Location – Wide Area



- 1.4 This report has been prepared in accordance with Planning Policy Framework (NPPF) and Lead Local Flood Authority's (LLFA) guidance for "*Guidance for developments and new builds*" (Online November 2023). Key reference documents and guidance are summarised at the end of Section 1.

National Planning Policy Framework

- 1.5 The National Planning Policy Framework (NPPF) and the Flood Risk and Coastal Change Section of Planning Practice Guidance (PPG) were most recently updated by the Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government in December 2023 and August 2022, respectively.
- 1.6 The NPPF states that “ *A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use*” (Para. 173, Footnote 59).
- 1.7 The aim of a site-specific flood risk assessment is to demonstrate that “ *the development should be made safe for its lifetime without increasing flood risk elsewhere*” (NPPF, Para. 165)
- 1.8 PPG advises the site-specific flood risk assessment must “ *assess the flood risk to and from a development site ...The assessment should demonstrate to the decision-maker how flood risk will be managed now and over the development’s lifetime, taking climate change into account, and with regard to the vulnerability of its users*”, as required by the Planning Practice Guidance (“*Site-specific flood risk assessment*”, Paragraph: 020 Reference ID: 7-020-20220825, online).

Structure and limitations of this FRA

- 1.9 This site-specific FRA has been written in line with the above Framework.
- 1.10 This document sets out the existing baseline conditions in Section 2, the development proposal and proposed surface water management plan in Section 3. Section 4 discusses other miscellaneous issues, before concluding in Section 5.

References

- 1.11 This FRA has been prepared with consideration of the following documents and guidelines

National Planning Policy Framework (December 2023);

Planning Practice Guidance – Flood Risk & Coastal Change (August 2022);

Plymouth Sound and Estuaries Designated Special Area of Conservation (online), Joint Nature Conservation Committee, (<https://sac.jncc.gov.uk/site/UK0013111>);

Plymouth's Local Flood Risk Management Strategy, Plymouth City Council, August 2023;

Tamar Catchment Flood Management Plan, Summary Report June 2012, Environment Agency;

Plymouth and South West Devon Joint Local Plan 2014-2034 (Adopted March 2019), by West Devon Borough Council, South Hams District Council and Plymouth City Council;

Plymouth and South West Devon Joint Local Plan 2014-2034-Supplementary Planning Document (Adopted July 2020), by West Devon Borough Council, South Hams District Council and Plymouth City Council;

Environment Agency (EA) Flood Warning Information Service 'Flood Risk from Rivers or the Sea' and 'Flood Risk from Surface Water' (online).

Environment Agency (EA) Long Term Flood Risk (online) (<https://check-long-term-flood-risk.service.gov.uk/map>).

Environment Agency (EA) Flood Risk Assessments: climate change allowances (online) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>)

Magic.gov.uk Soilscape Dataset (online).

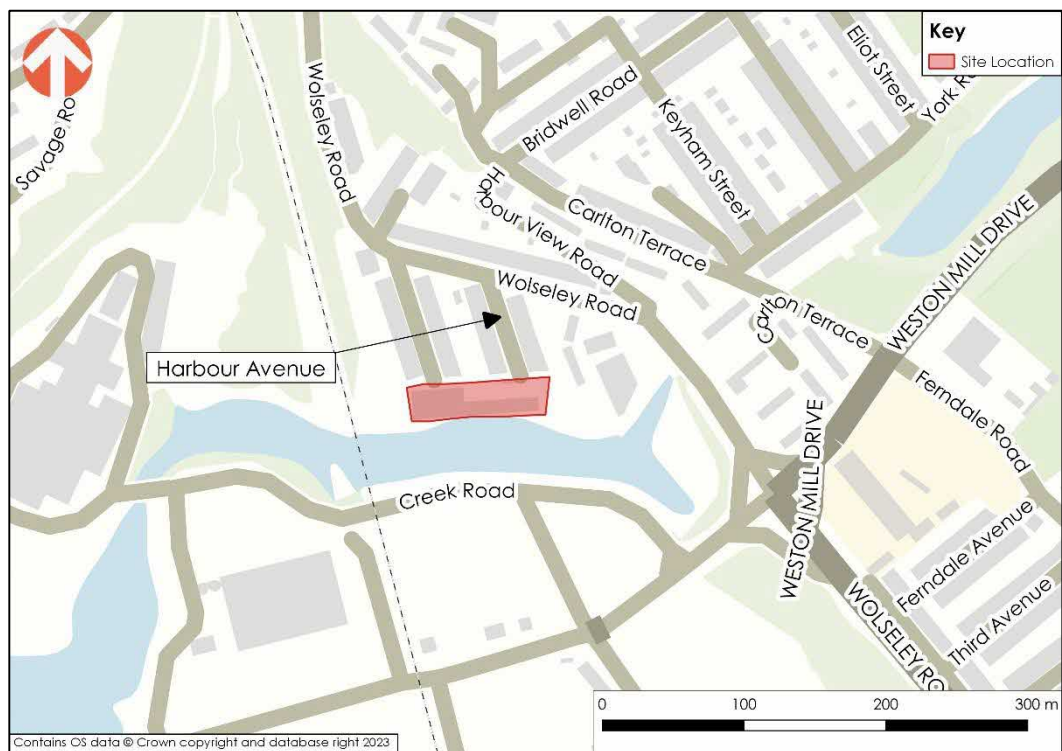
CIRIA Guide 753 – The SuDS Manual (November 2015).

2 Existing Conditions

Context

- 2.1 The proposed 0.25ha. site is located at the former ‘Camel’s Head Technology Centre’, previously part of City College Plymouth. The site is situated in the Camel’s Head area of Plymouth, approximately 3.5km to the north-west of Plymouth City Centre. The site is directly adjacent to the Ham Brook, which runs from east to west to discharge into Weston Mill Lake, part of the HM Devonport complex, approximately 0.5km to the south-west of the site.
- 2.2 The location of the proposed site in relation to its surroundings is shown on Figure 2.1 below.

Figure 2.1 - Site Location – Local Area



Existing land uses

- 2.3 The proposed development site is currently unoccupied and has an existing planning F1(a) use class in relation to its previous use as an educational site (Schools, Colleges and Universities).
- 2.4 The site currently comprises two industrial unit-style buildings linked by a covered outdoor working area, and associated parking. The

building in the east is single storey, whilst the larger building in the west is two-storey.

- 2.5 The site is granted vehicular access from Harbour Avenue via gated entry.

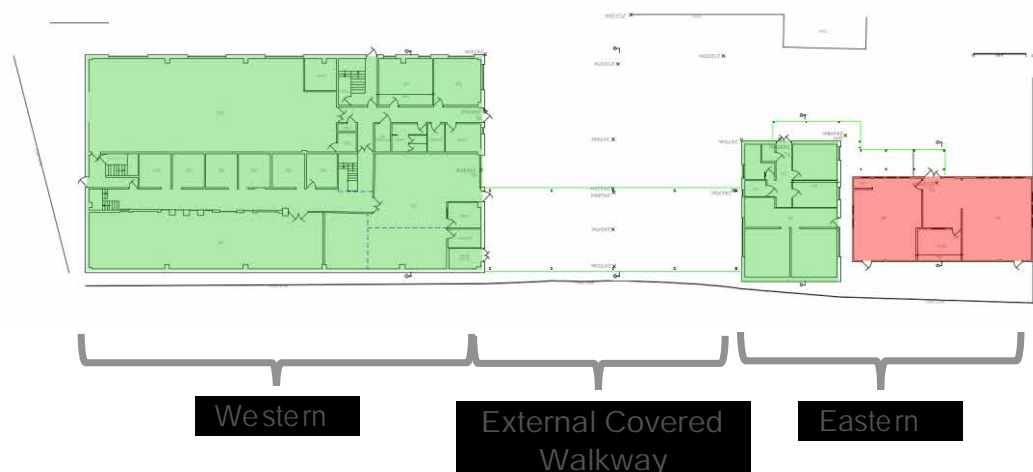
Surrounding land use

- 2.6 The site is located within a residential area. The site is bordered to the north by a cobbled street serving the residential area served by Harbour Avenue and Hamoaze Avenue. To the east is a residential parking lot.
- 2.7 Directly to the south of the site is the Ham Brook, whilst to the west is low-lying greenfield land on the northern bank of the Ham Brook.
- 2.8 The site is approximately 1.0km to the north-east of the River Tamar, belonging to the Special Area of Conservation (SAC) of ‘Plymouth Sound and Estuaries’ (ref. UK0013111).

Topographic survey

- 2.9 A topographic survey has been undertaken by JM Architectural (March 2023). The survey used an arbitrary datum and was imported into QGIS software and georeferenced using OS data. LiDAR data was then overlain to calculate the difference between arbitrary surveyed and ordnance datum levels. The correction required was found to be -20.787m.
- 2.10 Figure 2.2 indicates buildings on site are arranged east and west of a covered walkway that is not enclosed by walls.

Figure 2.2 – Building layout on site



- 2.11 Floor levels were found to be 4.04-4.07mAOD for the buildings shown in green and 4.34mAOD for the building shown in red.
- 2.12 The survey indicates that the site is relatively flat, sloping gently from the northern boundary (approx. 4.45mAOD) towards the southern boundary (approx. 3.90mAOD), with the watercourse beyond. The lowest level on site is 3.74mAOD on the northern edge of the covered walk way.
- 2.13 A copy of the topographical survey drawing can be found in Appendix A.

Flood Risk from Fluvial sources (River/Sea)

- 2.14 We have carried out a desktop assessment of potential flood risk from fluvial sources to the site using the Environment Agency's (EA) Flood Information Service and 'Product 4' data provided by the EA.
- 2.15 An extract of the 'Flood Map for Planning' has been reproduced as Figure 2.3 below and shows part of the site to be within Flood Zone 3, as land assessed as having a 'high probability' of flooding, with a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year. As a result, the site is also within an EA Flood Warning Area.
- 2.16 The Flood Zones are a tool to estimate the extent of extremes of flooding from rivers or the sea that would occur without the presence of flood defences.

Figure 2.3 – Flood Map for Planning



- 2.17 The Environment Agency ‘Tamar Catchment Flood Management Plan’ (June 2012) discusses the areas at risk of flooding from the River Tamar. The report states that as many as 1,600 residential properties are within Flood Zone 3 due to fluvial flooding from the River Tamar, with this number likely to increase as a result of climate change.
- 2.18 The Plymouth City Council ‘Local Flood Risk Management Strategy’ (August 2023) does not specify the ‘Hamoaze’ catchment in which the site resides as a key area at risk of fluvial flooding.
- 2.19 Based on the EA records, the site is not known to have flooded in the recent past.
- 2.20 The EA have supplied Flood Risk assessment data (formerly known as Product 4 data) for the proposed development site, included within Appendix B. The data includes modelled flood depths for various exceedance period storms from the ‘JFLOW (2007)’ and ‘Plymouth Coastal Model (2018)’ models for fluvial and tidal flows, respectively.
- 2.21 The ‘JFLOW’ model summarises the output from modelling conducted to estimate current and future depths and rates of flow

for given fluvial flood events in the vicinity of the site. This model considers the present-day defences without upgrades.

- 2.22 Node '3834' in the JFLOW model is in the watercourse immediately south of the site and indicates a maximum flood level of 2.64mAOD in the 0.1% Annual Exceedance Probability (AEP) event, approximately 1.3m below levels in the south of the site. This is supported by the flood mapping, which indicates that almost no flooding is expected to occur within the site boundary during the 0.1% AEP river flooding event, though this does not account for the effects of climate change. The small amount of flooding mapped within the site boundary is likely due to the resolution of the JFLOW flood extents.
- 2.23 The data supplied by the EA from their 'JFLOW (2007)' and 'Plymouth Coastal Model' indicate that tidal flooding is the principal source of flood risk to the site, with flood extents exceeding those from river flooding events. The southern extent of the site is estimated to flood in the 5% AEP 'Defended' scenario, though the flood extents do not affect access and egress routes in any 'Defended' scenario up to and including the 0.1% AEP event.
- 2.24 Upper End climate change allowances from Table 1 of the Environment Agency guidance 'Flood risk assessments: climate change allowances' for the south-west have been calculated for a commercial design life of 60 years from 2024 as 0.77m. Calculation of sea level rise is included within Appendix C.
- 2.25 The 'Plymouth Coastal Model (2018)' includes a climate change scenario in the defended and undefended case based addition of 0.78m. The modelling output for this event can be used as the relevant event where climate change is considered. Table 2.1 provides flood levels from the model in the defended and undefended scenarios for the 0.5% AEP tidal event, with and without a sea level rise of 0.78m.

Table 2.1 – EA 'Plymouth Coastal' Tidal Flood Levels (Label 12)

| Event | Defended (mAOD) | Undefended (mAOD) |
|-------------------|-----------------|-------------------|
| 0.5% AEP | 3.51 | 3.54 |
| 0.5% AEP (+780mm) | 4.30 | 4.29 |

- 2.26 These data indicate there is a negligible difference between the defended and undefended flood levels.
- 2.27 The EA 'Coastal Design Sea Levels – Coastal Flood Boundary Extreme Sea Levels' (2018) dataset includes data points in the Tamar Estuary. The 0.5% AEP Tidal Still Water Level at the data point north of the confluence of the Ham Brook at Devonport is 3.49mAOD, This level is below the 0.5% AEP flood level indicated in Table 2.1 and therefore the modelled levels from the 'Plymouth Coastal Model (2018) are considered an appropriately robust tidal flood level for this assessment.

Existing flood risk (Non-fluvial)

- 2.28 We have carried out a desktop assessment of potential flood risks to the site using the EA's Flood Information Service to assess the flood risk from pluvial and artificial sources.

Pluvial sources

- 2.29 An extract of the 'Flood Risk from Surface Water' mapping has been reproduced as Figures 2.4A and 2.4B. This mapping is based on LiDAR data, with Figure 2.4A indicating the low risk (annual probability <1%) surface water flooding, and Figure 2.4B indicating the very low risk (annual probability <0.1%) surface water flooding.

Figure 2.4A – Flood Risk from Surface Water (1 in 100 year event)



Figure 2.4B – Flood Risk from Surface Water (1 in 1000 year event)



2.30 Figure 2.4A indicates the presence of surface water flooding of depths of 300-600mm along the northern boundaries of the existing

buildings, with conveyance routes appearing around the east and west boundary of the site to discharge into the Ham Brook.

- 2.31 Figure 2.4B indicates widespread surface water flooding across the site, with depths of 600-900mm along the northern boundaries of existing buildings. Flooding is also shown within the western building, covered area, and parts of the eastern building.
- 2.32 It is likely that the surface water flood modelling does not account properly for the external covered accessway between the buildings on the eastern and western sides of the site, treating it as a building. In reality, flows would be allowed to continue south through the site, and would over the edge of the site into the Ham Brook, instead of being impounded in the areas indicated.
- 2.33 The southern edge of the site is at a level of 3.9mAOD and it is expected that pluvial flood levels would be limited by this level. It is therefore considered that the pluvial flood levels and depths would be lower than those mapped in the surface water flood mapping, so long as the water levels within the Ham Brook do not exceed this level.
- 2.34 The Plymouth City Council 'Local Flood Risk Management Strategy' (August 2023) does not specify the 'Hamoaze' area in which the site resides as a key area at risk of surface water flooding. The report states that surface water flooding may occur in Wolseley Road due to a lack of capacity in the combined sewer system, as reflected in Figure 2.4A.
- 2.35 The high risk (annual probability <3.3%) surface water flooding map indicates no flooding within the site or immediate surroundings.

Artificial sources

- 2.36 The site does not lie within the maximum extent of flooding from any reservoirs and there are no known on-site flood risks associated with infrastructure failure.

Flood Risk Summary

- 2.37 In summary, within the 60 years life-time of the commercial development, tidal flooding is the principal flood risk, with a maximum anticipated flood level of 4.3mAOD. The lowest surveyed level on site is 3.74mAOD and FFLs are at or above 4.04mAOD, .

Therefore, maximum anticipated flood depths are 0.26m in buildings and 0.56m elsewhere.

Existing site drainage

- 2.38 The site is located to the south of a residential area served by surface and foul sewers.
- 2.39 A review of the South West Water asset records indicate the presence of an adopted 225mm foul sewer beneath the cobbled street beyond the northern boundary of the site. The foul sewer runs eastwards to Wolseley Road where it discharges into a 425mm Combined Sewer. It is likely that the existing site is served by this connection, which will be retained and maintained without change.
- 2.40 A 225mm surface water sewer crosses the site from north to south, discharging into the Ham Brook. It is expected that surface water flows collected within the site by the existing drainage regime discharge into this surface water sewer, and the current drainage arrangements will be retained and maintained without change.
- 2.41 A copy of SWW asset maps in the immediate vicinity of the site is provided in Appendix D.

Existing surface water runoff

- 2.42 Rainfall falling on rooftops within the site is expected to be captured by rainwater pipes and discharged directly to the surface water sewer beneath the site.
- 2.43 The remainder of the site area is all existing hardstanding. Rainfall on these areas is expected to drain to low points within the site where it is then captured by the existing drainage regime and discharged to the surface water sewer beneath the site.
- 2.44 The topographical survey and wider baseline information does not indicate any existing attenuation features within the site or its immediate surroundings.
- 2.45 It is expected that any residual site runoff would drain overland towards the southern boundary of the site and to the Ham Brook beyond. As there are no changes associated with the

development, the change of use of the building will not increase flood risk within or beyond the site.

Ground conditions

- 2.46 The site is overlain by made ground, with the entirety comprised of either building structures or hardstanding surfacing.
- 2.47 A review of the LandIS Soilsapes Dataset indicates that the site is underlain by 'Freely draining slightly acid loamy soils' as shown in Figure 2.4 below.

Figure 2.4 – Soilsapes extract



- 2.48 British Geological Survey (BGS) geological mapping shows that the superficial deposits underlying the site consist of Tidal River or Creek Deposits – Clay and Silt. The bedrock deposits consist of Slate and siltstone of the Saltash Formation.

3 Development Proposals

Introduction

- 3.1 The proposed development site, with an area of 0.25ha, proposes a change of use from Class F1(a) to Classes B8 and E.
- 3.2 The proposed development will comprise the renewal of existing hardstanding areas, with the covered area linking the existing units repurposed as a covered parking area.
- 3.3 The existing units are to be repurposed largely for business storage, distribution, and office use, with other areas within the buildings to be used for self-storage and recreational use.
- 3.4 The existing vehicular access from Harbour Avenue, external levels, and surface water drainage regime are to be retained as existing.
- 3.5 A copy of the proposed site layout has been included in Appendix E.

Vulnerability

- 3.6 In the sites previous use as the 'Camel's Head Technology Centre', the site was previously use class F1(a). Annex 3 Flood Risk Vulnerability Classifications indicates educational establishments are considered 'More Vulnerable'.
- 3.7 Buildings used for storage and distribution, and offices, are considered 'Less Vulnerable'. The proposed development therefore represents a decrease in the vulnerability of the site.
- 3.8 The development does not propose that the size of any existing buildings be changed, and thus can be considered a 'Minor development' in accordance with Planning Practice Guidance. Owing to both this and the 'change of use' nature of the proposed development, the sequential test is not required to be applied.
- 3.9 Since the sequential test is not required for the site, the exception test may be waived for the proposed site, with the reduction in vulnerability representing betterment over former use.
- 3.10 The proposed development is therefore classified as an appropriate form of development for the level of flood risk at the site, which lies in Flood Zone 3.

Cross sections and finished levels

- 3.11 It is anticipated that external and finished floor levels within the site will remain unchanged from existing conditions. Existing FFLs range between 4.04mAOD and 4.34mAOD, whilst the lowest surveyed site level is 3.74mAOD.
- 3.12 The EA's pluvial mapping considers the covered walkway to be a building that impounds flow on site. Since the area is an open covered walkway without walls it is anticipated peak flood level of flooding on site from pluvial sources will be controlled by the lowest site level to the south of 3.9mAOD, which is below the lowest FFL on site.
- 3.13 Baseline information indicates that tidal flooding is the principal flood risk to the site. The site and buildings are expected to be safe from tidal flooding up to the 0.5% AEP tidal event where peak tidal flood levels are estimated at 3.54mAOD.
- 3.14 Peak tidal flood levels including an allowance for climate change of +0.78m are 4.30mAOD. Under these conditions, the eastern (red) building, as shown in Figure 2.2, remains above the flood level. The depth of flooding in the western (green) buildings is estimated to be 0.23-0.26m and external flood depth on site ranges between 0.0m and 0.56m.
- 3.15 The assessment above indicates the site is at risk of tidal flooding if sea-level rise due to climate change is realised. Since the development is a change of use that does not propose to alter existing levels or areas, the extent and depth of flooding unchanged from the existing situation, and there is no increase in flood risk. As a result of the reduction in flood vulnerable classification from 'more vulnerable' to 'less vulnerable' there is an overall reduction in flood risk as a result of the proposals.

Safe access and egress

- 3.16 The southern extents of the site and surrounding area are within Flood Zone 3 (see Figure 2.2), with the eastern extents of the site falling within Flood Zone 2.
- 3.17 The site is located within an area which receives EA Flood Alert and Warnings (South Cornwall Coast from Rame Head to Wembury Bay including tidal estuaries).

- 3.18 A Flood Warning Evacuation Plan (FWEP) has been prepared to consider the relevant flood warning codes that would trigger evacuation of the site, with occupants to evacuate to higher ground outside the maximum extents of flooding.
- 3.19 Where evacuation is not possible, due to an unforeseen flood scenario, without any prior warning, the first floor of the western unit would provide safe refuge. The FWEP sets out a suitable protocol which should be followed.
- 3.20 A copy of the FWEP can be found within Appendix F of this report.

Flood Risk Mitigation Strategy

- 3.21 Site occupants should register to receive Flood Alert and Warning codes. Where a warning provides sufficient time to evacuate the building, all occupants should vacate and seek safe refuge on higher ground, outside the areas susceptible to flood risk (in line with the evacuation plan included within the FWEP).
- 3.22 Flood resistance measures should be considered as part of any refurbishment works within the existing buildings. This might include:
- Use of flood proof external doors.
 - Raised electrical sockets.
 - Mount boilers on the wall.
 - Use of flood resilient building materials and finishes for any refurbishment works, such as waterproof plasterboard, horizontal closed cell insulation boards, concrete floors and ceramic tiles, galvanised kitchen units, etc.
 - Locate keys or critical/valuable equipment (i.e. servers etc) above the flood level.

Surface water drainage strategy

- 3.23 The existing surface water drainage regime is to be retained in full, with all rainwater pipes and connections to the existing surface water sewer beneath the site to be retained.
- 3.24 During redevelopment and refurbishment works, the condition of existing drainage infrastructure will be assessed, with remedial measures taken when required.



Foul water drainage strategy

- 3.25 It is assumed that the site discharges to the foul sewer to the north of the site. The existing point of connection for foul flows is to be retained.
- 3.26 All private foul flows are expected to originate from existing private foul infrastructure, with no new sewers requiring installation.

4 Miscellaneous Issues

Construction issues

- 4.1 Any facilities for the storage of oils, fuels or chemicals need to be situated in suitable bunded bases that will be equivalent to at least the volume of the tank plus 10%.

Maintenance

- 4.2 All on-site drainage would be retained under private ownership and will become the responsibility of the building operator.
- 4.3 The operation and maintenance of any SuDS features will be undertaken in accordance with 'CIRIA C753 – The SUDS Manual, Chapter 32 – Operation and Maintenance'.

5 Mitigation, Conclusions and Recommendations

Mitigation

- 5.1 The proposed development has been assessed NPPF, to allow the planning application to be progressed and to show that the development can be undertaken in an acceptable manner from a flood risk perspective.
- 5.2 The proposed development is located within 'Flood Zone 3', as land assessed as having high probability of flooding with a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability flooding from the sea (>0.5%) in any year.
- 5.3 The EA 'Flood Risk assessment data' (formerly known as Product 4 data) for the proposed development site indicates that tidal flooding is the main mechanism by which flooding is expected to occur. Using data from the 'Plymouth Coastal' model, a 'worst case' flood level of 4.30mAOD has been estimated, which would result in flooding of up to 0.26m across the existing ground floors of on-site buildings.
- 5.4 The proposed development site is susceptible to surface water flooding in events exceeding the high risk (annual probability <3.3%) rainfall event. EA Surface water flooding maps show flows impounded by the central unit within the existing site, which is in fact only a roof and would not impound flows. In re exceedance flows would be allowed to continue south through the site to the Ham Brook instead of being impounded.
- 5.5 The proposed development represents a change in use only, with the vulnerability reducing from a 'More vulnerable' educational establishment to 'Less Vulnerable' business and retail development. The proposed development is therefore classified as an appropriate form of development for the level of flood risk at the site, which lies partially within Flood Zone 3.
- 5.6 A Flood Warning Evacuation Plan has been prepared and should be implemented to ensure the site is safely operated and managed during times of flooding.

Conclusions

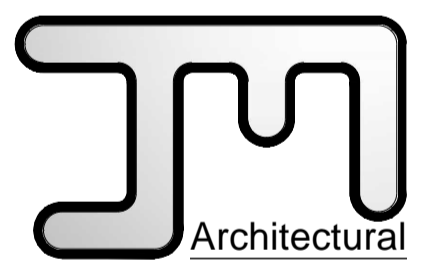
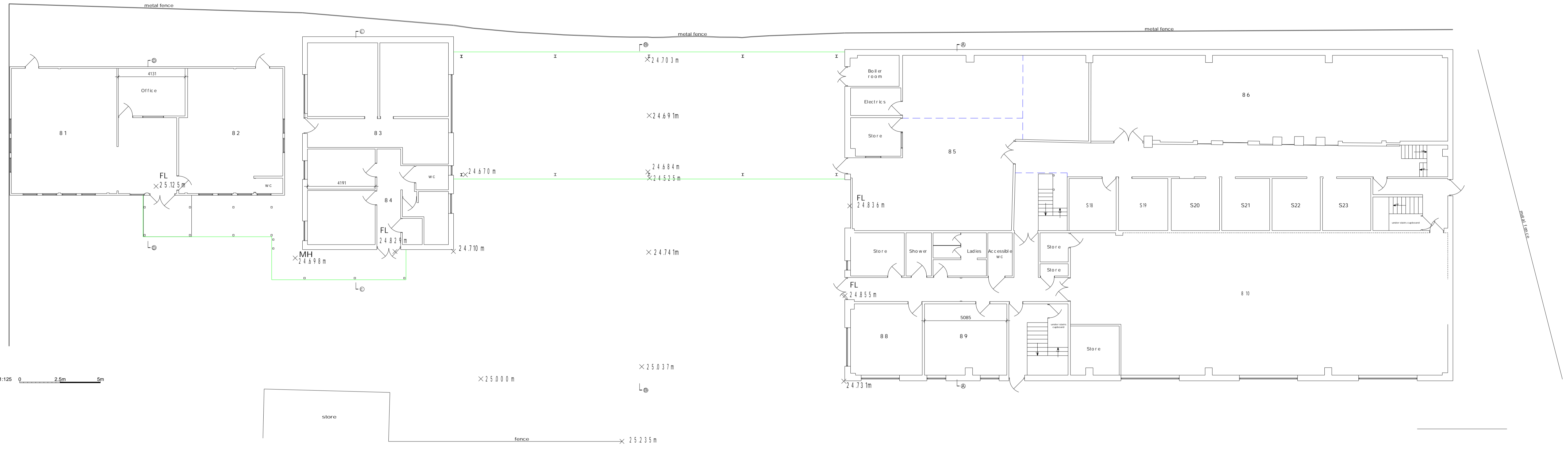
This Flood Risk Assessment has been assessed in . It is concluded that the development can be undertaken in a s manner, without increasing flood risk to existing properties in the downstream catchment.

Recommendations

- 5.7 The site represents a change in use and reduction in vulnerability compared to previous use. The site will be registered for EA flood alerts and warnings and will implement a Flood Warning Evacuation Plan to ensure the residual flood risks are suitably managed.
- 5.8 Given the above, it is recommended that the Lead Local Flood Authority advise the local planning authority that they have no objections to the proposed development.



Appendix A Topographic Survey



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 e-mail: jjmddesign@yahoo.co.uk www.jmddesign.org.uk

Client: Mr R Spriggs
 warehouse & units
 Harbour Avenue
 Plymouth
 Devon
 PL5 1BH

Job: Survey

Dwg: E; S7,1 *

Application Reference

Scale (at A1): 1:125

Date: Mar 2023

Drawn: JH

Drawing Number

120702

27FEB2023 DRAWINGS SPRIGGS 1207-

Contractors must check all dimensions on site, only figured dimensions are to be worked from. All discrepancies must be reported immediately to the Supervising Officer before proceeding. © Copyright J&M Design



Appendix B EA Flood Maps and data

FIRST

Please check the latest Climate Change allowance :-

[Flood risk assessments: climate change allowances - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/612222/Climate-change-allowances-2022.pdf)

We expect you to use the scenario values as shown on the adjacent table for the different types of development. You may provide different scenario (i.e. High Cen for SLR) as additional assessment but we will use these values/allowances for our assessments of FRA/Designs

*CFB = Coastal Flood Boundary – available at data.gov.uk

Valid May 2022 – FCRM

DCIS Climate Change Allowances – Strategic and Development Planning

| Development Vulnerability NPPG | Rainfall 1% Storms | | River Less than 5km2 | | Fluvial | Sea Level Rise (SLR) Upper End |
|--------------------------------|--------------------|------------|----------------------|---------|---------------------------------------|--------------------------------|
| | Exe & East Devon | All others | Urban | Rural | | |
| | | | | | Use 2080s values for all | Added to CFB* 2017 data |
| Commercial 60yr lifetime | 30% | 30% | 30% | ? - tbc | Central Allowance- See map next page | 0.74m (2082 value) |
| Residential 100yr lifetime | 45% | 50% | 50% | ? - tbc | Central Allowance - see map next page | 1.445m (2122 value) |
| Essential Infrastructure | 45% | 50% | 50% | ? - tbc | Higher Central - See map next page | Please confirm with EA office |

SPDC@environment-agency.gov.uk or SW_Exeter-PSO@environment-agency.gov.uk

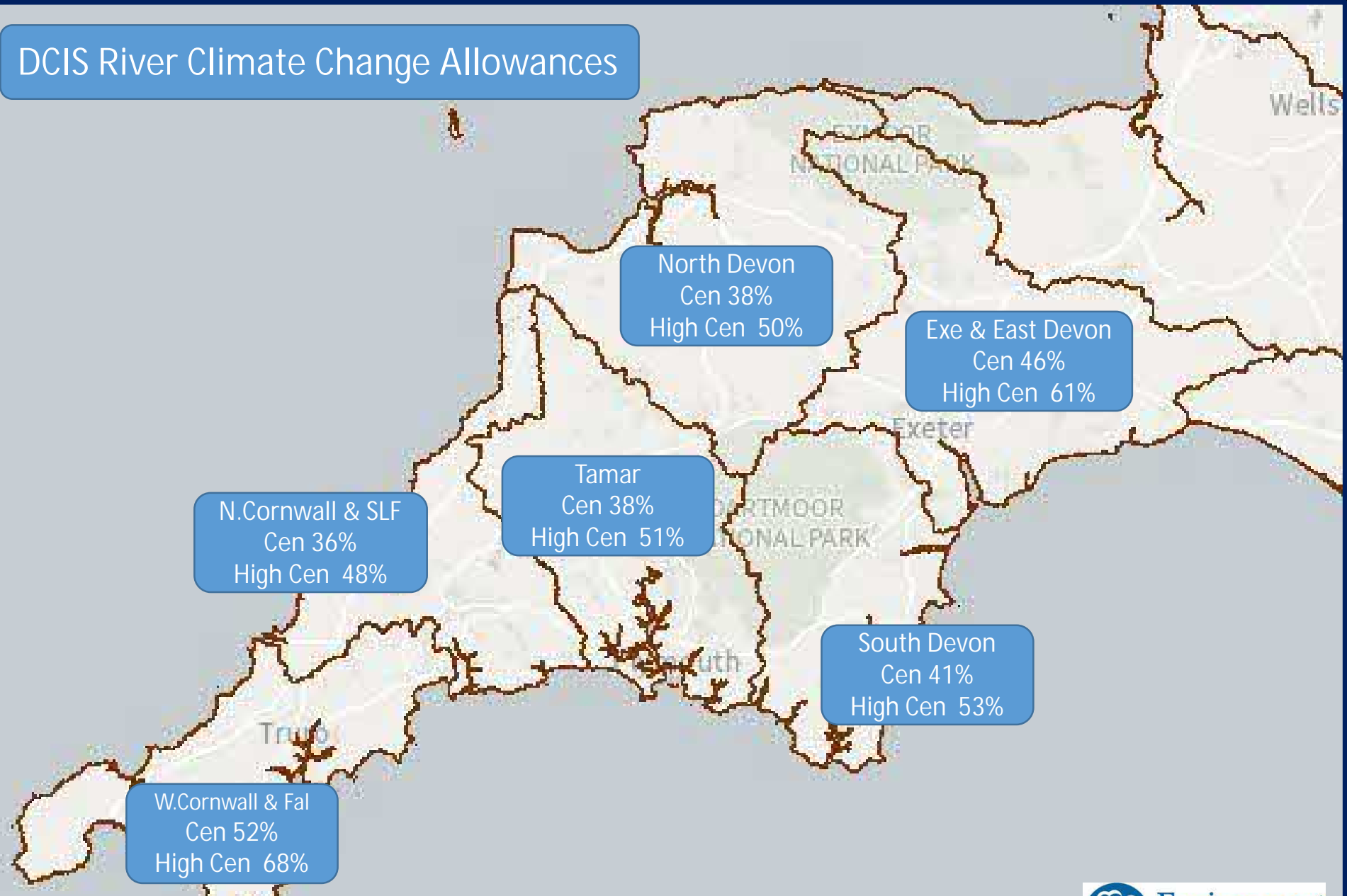
FIRST

Please check the latest Climate Change allowance :-

Flood risk assessments: climate change allowances - GOV.UK
(www.gov.uk)

- Wave Actions (Coastal & Estuary) will also have to be considered
- Freeboard will need to be added to set minimum floor or defence levels
- +40%CC Modelled scenarios, may still be used for some catchments (>5% diff from new values).

DCIS River Climate Change Allowances



Valid May 2022 - FCRM

SPDC@environment-agency.gov.uk or SW_Exeter-PSO@environment-agency.gov.uk

Flood risk assessment data



Location of site: 245032 / 57452 (shown as easting and northing coordinates)
Document created on: 19 December 2023
This information was previously known as a product 4.
Customer reference number: JC6PC8UDGCRR

Map showing the location that flood risk assessment data has been requested for.



Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change




This data is updated on a quarterly basis as better data becomes available.

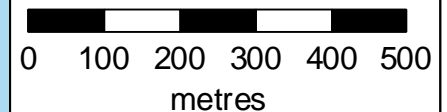
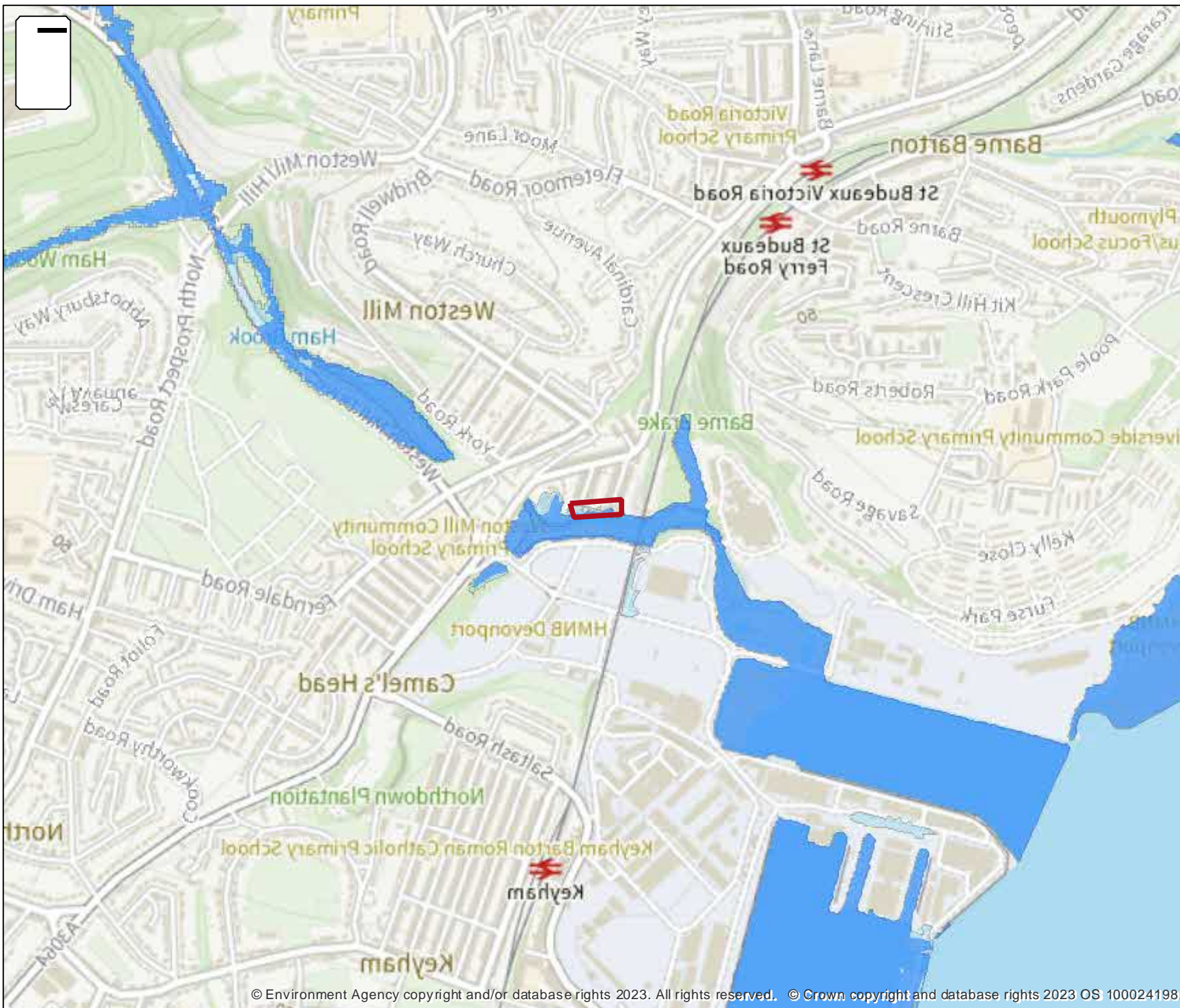
Flood map for planning

Location (easting/northing)
245032/57452

Scale
1:10,000

Created
19 Dec 2023

-  Selected area
-  Flood zone 3
-  Flood zone 2



Records of flooding in the Plymouth area.

| Date | Location | Detail | Cause | Estimated Number of Properties Flooded | Flood Source |
|------------|----------|---|--|--|---------------------------------|
| 19/06/2009 | Plymouth | Plymouth, Weston Mill. Weston Mill Drive, Camels Head. Report of flooding, no further details. | Unknown | | Unknown |
| 10/10/2006 | Plymouth | Plymouth: Gdynia Way, Wolsley Rd, Kings Rd, Paradise Road and the Keyham and Devonport areas of the city were affected by flood waters following heavy rainfall and storm conditions. | Severe storms, heavy rainfall | | Surface Water Runoff |
| 16/03/2004 | Plymouth | Plymouth, Weston Mill. Flooding to the subway under St. Budeaux by-pass following heavy rainfall and the failure of a pumping station. Also earlier incident involving a deficient sealing plate on a storm water storage tank. | Pumping station not operating sufficiently to deal with surface water collecting in subway | 0 | Sewerage & Surface Water Runoff |
| 04/01/1998 | Plymouth | Plymouth, Weston Mill. Flooding in Woseley Road following torrential rainfall. No specific details | Not known | | Unknown |

| Date | Location | Detail | Cause | Estimated Number of Properties Flooded | Flood Source |
|------------|----------|---|--|--|---------------------------------|
| 31/10/1994 | Plymouth | Plymouth. Flooding reported on Wolseley, College, Eggbuckland, Beaumont, Houndiscombe, Mannamead and Saltash Roads and Union Street. Number of properties affected unknown. | Hydraulic inadequacy of sewer system, following prolonged rainfall. | 0 | Sewerage & Surface Water Runoff |
| 02/12/1992 | Plymouth | Plymouth: Flooding following heavy rainfall on Wolsley Road, Plym Bridge Lane and in St. Budeaux. In Crownhill the Telephone exchange was flooded. | Heavy rainfall and storm force winds | | Surface Water Runoff |
| 01/03/1983 | Plymouth | Plymouth. Flooding on Wolseley Road and surrounding roads (Camels Head, North Prospect) as a result of surcharging sewers following heavy rainfall with excess water collecting in low points of the highway. Highway flooding was experienced on Stuart Road (| Heavy rain surcharges sewers and excess water collects at low points | 0 | Sewerage & Surface Water Runoff |
| 01/01/1975 | Plymouth | Plymouth. Surface water flooding affecting Wolseley Road. | Unknown assumed surface drainage issue following heavy rainfall | | Surface Water Runoff |

This list contains all the records of flooding we hold, in a 1km radius of the specified location. Although this information is compiled to the best of our knowledge, the absence of flooding does not mean that an area has not flooded in the past, nor guarantee it will not flood in the future. Our records are updated as more information comes to light, and as flood incidents occur.

Correct as of 19 / 12 / 2023

Modelled data

About the models used

Model name: Plymouth Coastal

Date: 2018

Model name: JFLOW

Date: 2007

This model contains the most relevant data for your area of interest.

You will need to consider the [latest flood risk assessment climate change allowances](#) and factor in the new allowances to demonstrate the development will be safe from flooding.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occurring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Plymouth Coastal Model (2018)

We have provided data from the Plymouth Coastal Model, 2018. Please consider the following information when using this model data:

This is coastal model, and does not consider the risk of flooding from other source, including fluvial or surface water flooding.

The study area extends from Plymouth Sound, up the Tamar estuary as far as Weir Quay, and includes the tidal rivers the Lynher and Plym.

A 1D-2D ESTRY-TUFLOW model was constructed to assess the coastal flood risk. The model incorporates a tidal boundary, a wave overtopping boundary and a wind boundary. A range of model scenarios and extreme events were simulated.

A low-resolution copy of this model (coarse model) was also developed to assess how wind conditions affect water levels at Plymouth. The results from this model were used in the calculation process of the boundary conditions for the detailed, high resolution model

The detailed flood inundation model includes wave overtopping boundaries at coastal defences

The maps and digital data supplied should be considered only a summary of the conclusions of the study. It will be necessary to collect more detailed topographic information for particular sites where development is proposed and undertake a more detailed site-specific hydrological and hydraulic analysis for the location using guidance from the National Planning Policy Framework (NPPF)

In this commission the focus has been on flooding from the sea rather than from fluvial sources. It is important that consideration is given to fluvial flooding for any development sites if appropriate. The impact of combined fluvial and tidal events should be examined to understand the impact that this has upon flood depth extent and the duration of inundation

The model has been calibrated to the 14th February 2014 event

To calculate the impact of climate change on wave overtopping discharge rates, changes were applied to the water level, wind speeds and wave heights.

Any assessment of Flood Risk undertaken must be appropriate for the decisions that need to be based upon it, consider the risks and also take into account any limitations of the data used.

Please be aware that the Environment Agency does not guarantee that this data is suitable for your purposes.

December 2018



You asked us to provide you with depth / flow / water level data from the JFLOW model used to produce the Flood Zones.

The water depths have been produced from the JFLOW model (2007) as a 'by-product' of running the model to produce Flood Zones.

In 2013, over 600km of watercourses were remodelled using JFlow+. These watercourses were either previously not modelled in 2008, or where modelled using a lesser quality DTM. This project used an improved DTM, revised hydrology and the latest version of Jflow+.

You should be aware of the following points.

Our work to produce Flood Zones followed a 10 year programme which delivered more detailed mapping for 821 locations. However, in order to complete Flood Zones we needed national coverage, hence a generalised approach was used to provide this national coverage within the time available, to fill the gaps between the 821 locations where we had more detailed information. The Flood Zones are therefore not as accurate as we would normally specify for river modelling, but they do provide an adequate indication of the extent of flood risk such that developers can consider flooding as part of their proposals to ensure they are not unknowingly putting additional lives at risk. This is the purpose for which the Flood Zones were produced

Depths outputs were not specified when we commissioned this generalised modelling for Flood Zones. As the JFLOW modelling method was developed, tested and reviewed for production of the Flood Zone extents only, we currently have no information on the accuracy of the water depth data.

The models were run using a Digital Terrain Model (DTM) with a grid generalised to between 5m and 100m (depending on the type of model and location, for reasons such as processing speed). Fluvial modelling produced depth data which can be processed using the DTM to provide water level data. However the differing grid sizes means that there is a significant potential for inaccuracy in producing level data, because of the DTM generalisation. Therefore because of the nature of the model and the DTM, in many cases it will not be possible to confidently assess whether or not a site is above the resulting water level. This is because there are further inherent uncertainties in the depth calculation and within the DTM itself.

Depth or level outputs from the National Generalised Modelling (JFLOW) are suitable to be used for decision making at a broad catchment scale

JFLOW and JFlow+ is a suitable method for broad scale flood mapping. It may however fail to produce satisfactory results in some locations.

They are not suitable for use in site specific Flood Risk Assessments or Strategic Flood Risk Assessments and must not normally be used for these studies. However, where in exceptional circumstances Nationalised Generalised Modelling outputs are requested to be used for anything other than at a broad catchment or Shoreline Management Plan coastal cell scale further verification must be undertaken.

For the 2013 data we can provide the data for the 100 year plus climate change scenario. The influence of climate change on expected flows for the 2080 planning horizon was represented by increasing the 1 in 100-year flood hydrograph by 30%.

Any assessment of Flood Risk undertaken must be appropriate for the decisions that need to be based upon it, consider the risks and also take into account any limitations of the data used.








Please be aware that the Environment Agency does not guarantee that this data is suitable for your purposes.

Defended modelled tidal extent

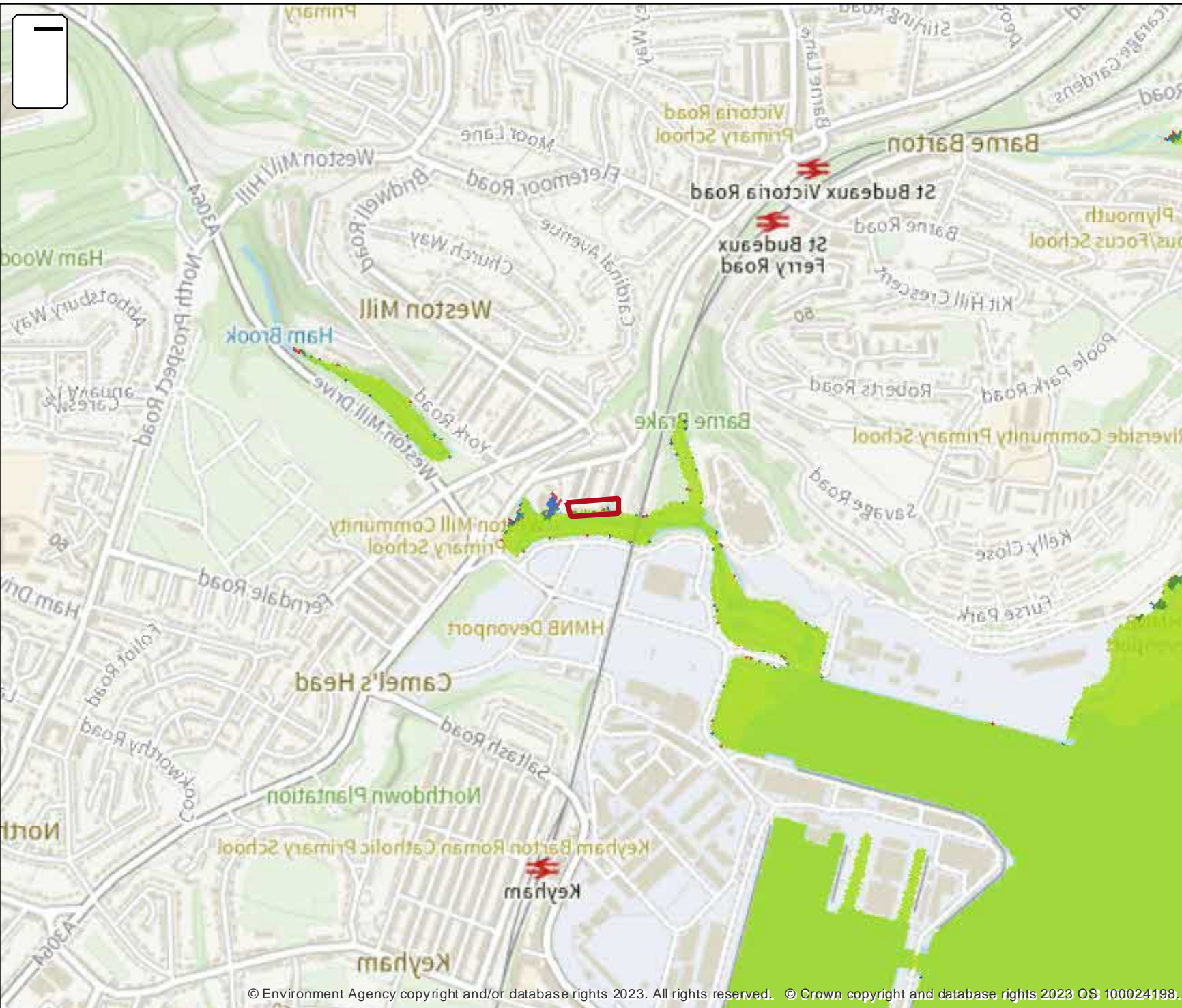
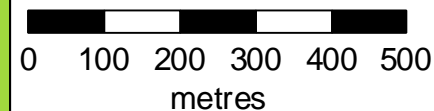
Location (easting/northing)
245032/57452

Scale Created
1:10,000 19 Dec 2023

Model name
Plymouth Coastal

-  Selected area
- Modelled flood extent
-  5% AEP
-  2% AEP
-  1.33% AEP
-  1% AEP
-  0.5% AEP
-  0.1% AEP

Flood extents may not be visible where they overlap other return periods






Defences removed modelled tidal extent

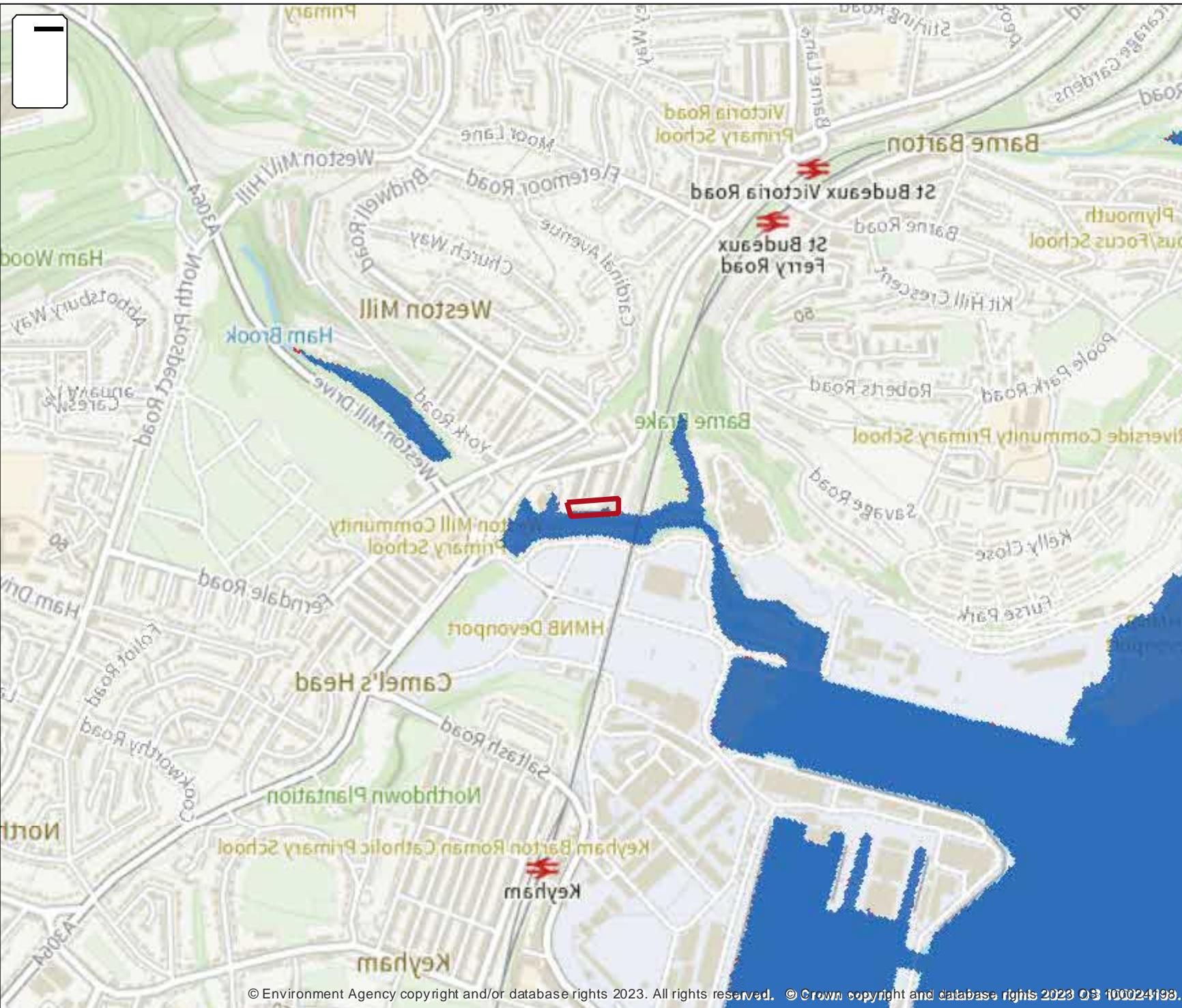
Location (easting/northing)
245032/57452

Scale Created
1:10,000 19 Dec 2023

Model name
Plymouth Coastal

-  Selected area
-  0.5% AEP
-  0.1% AEP

Flood extents may not be visible where they overlap other return periods












Defended climate change modelled tidal extent

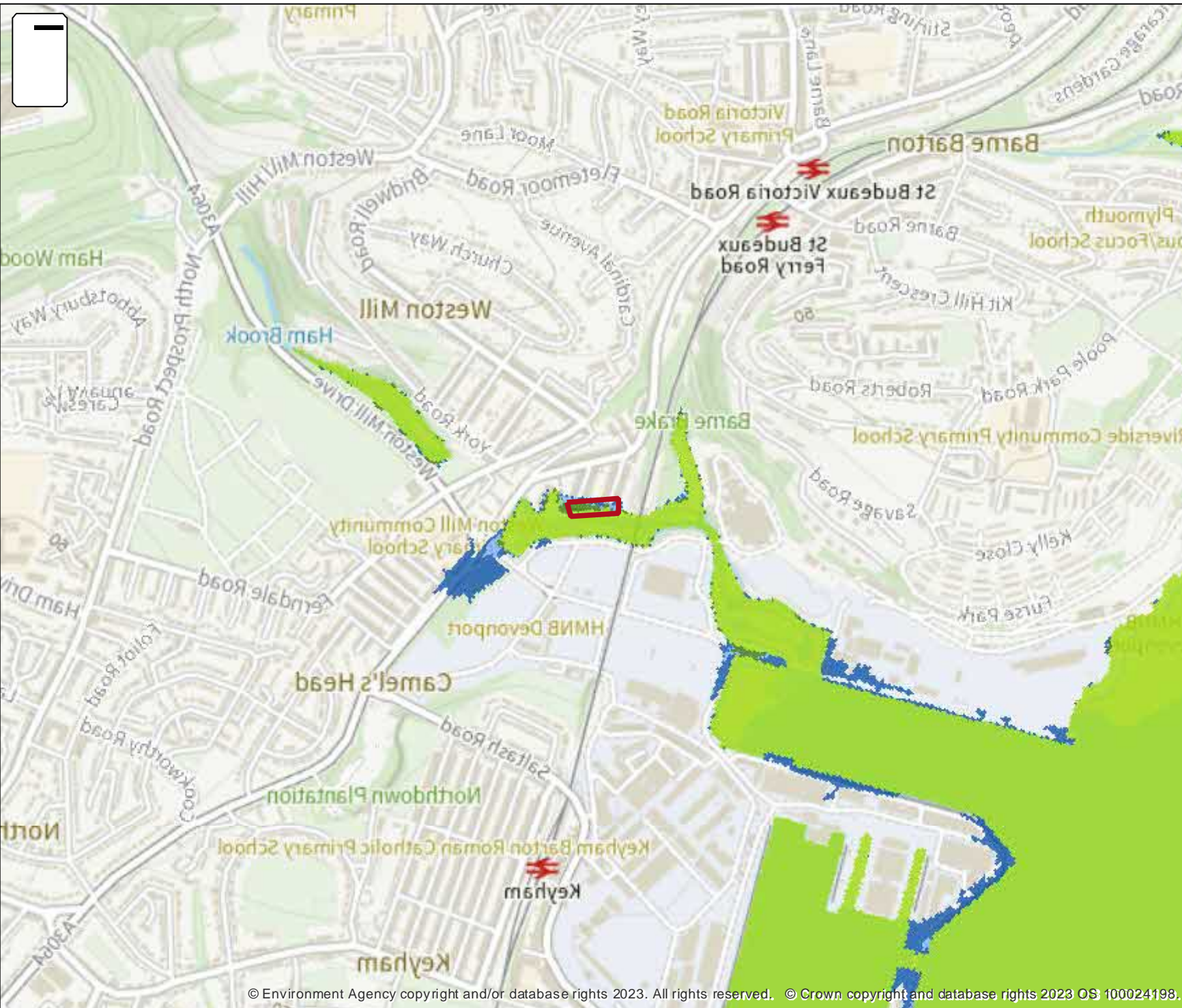
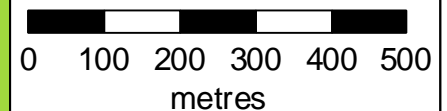
Location (easting/northing)
245032/57452

Scale Created
1:10,000 19 Dec 2023

Model name
Plymouth Coastal

-  Selected area
-  Main river
- Modelled flood extent**
-  1.0% AEP (+350mm)
-  1.0% AEP (+780mm)
-  0.5% AEP (+350mm)
-  0.5% AEP (+780mm)
-  0.5% AEP (+1080mm)
-  0.1% AEP (+350mm)
-  0.1% AEP (+780mm)

Flood extents may not be visible where they overlap other return periods








Defences removed climate change modelled tidal extent

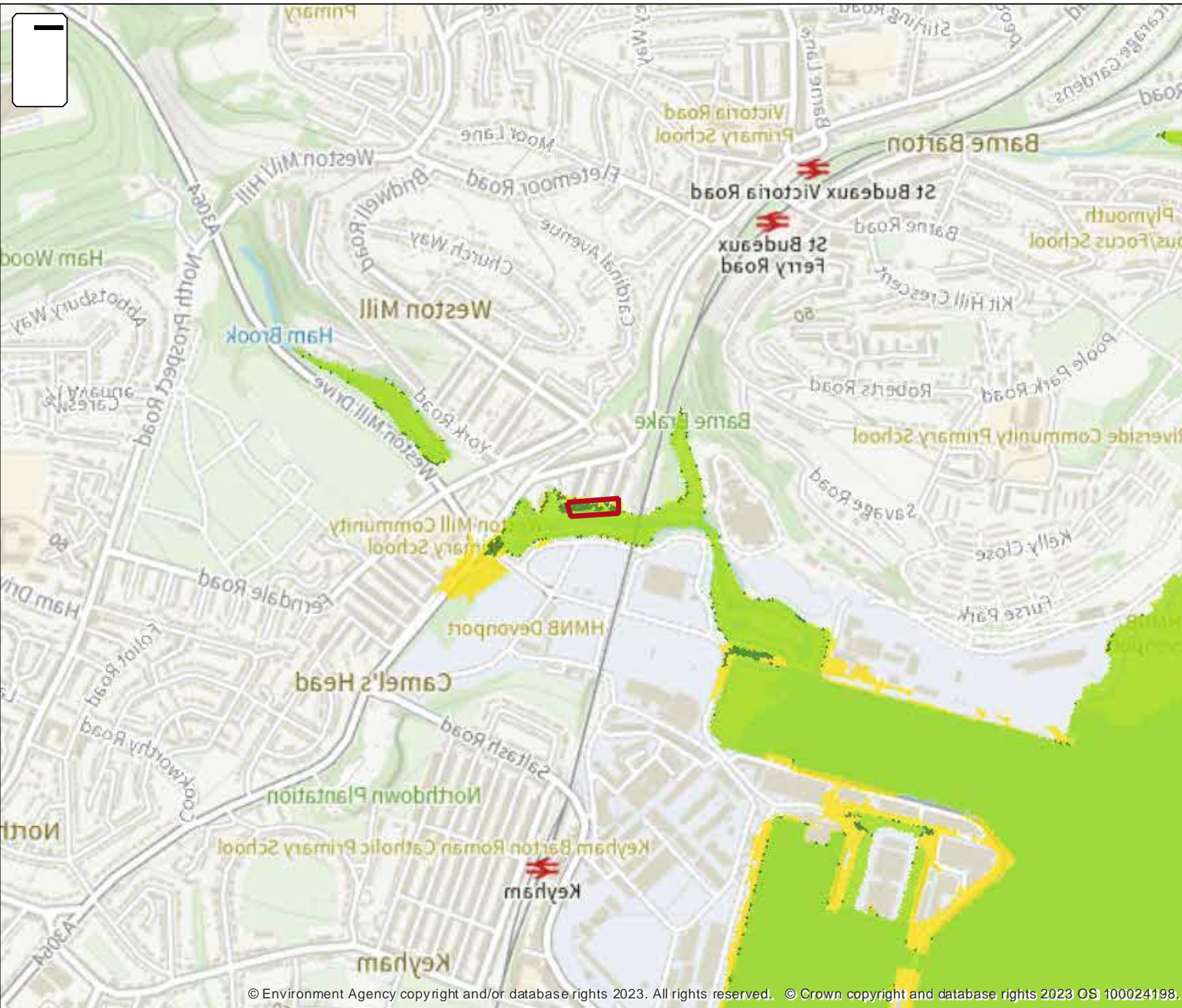
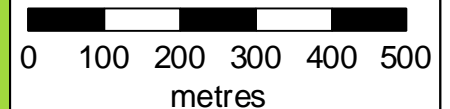
Location (easting/northing)
245032/57452

Scale Created
1:10,000 19 Dec 2023

Model name
Plymouth Coastal

-  Selected area
-  Main river
- Modelled flood extent
 -  0.5% AEP (+350mm)
 -  0.5% AEP (+780mm)
 -  0.5% AEP (+1080mm)

Flood extents may not be visible where they overlap other return periods







No defences exist modelled fluvial extent

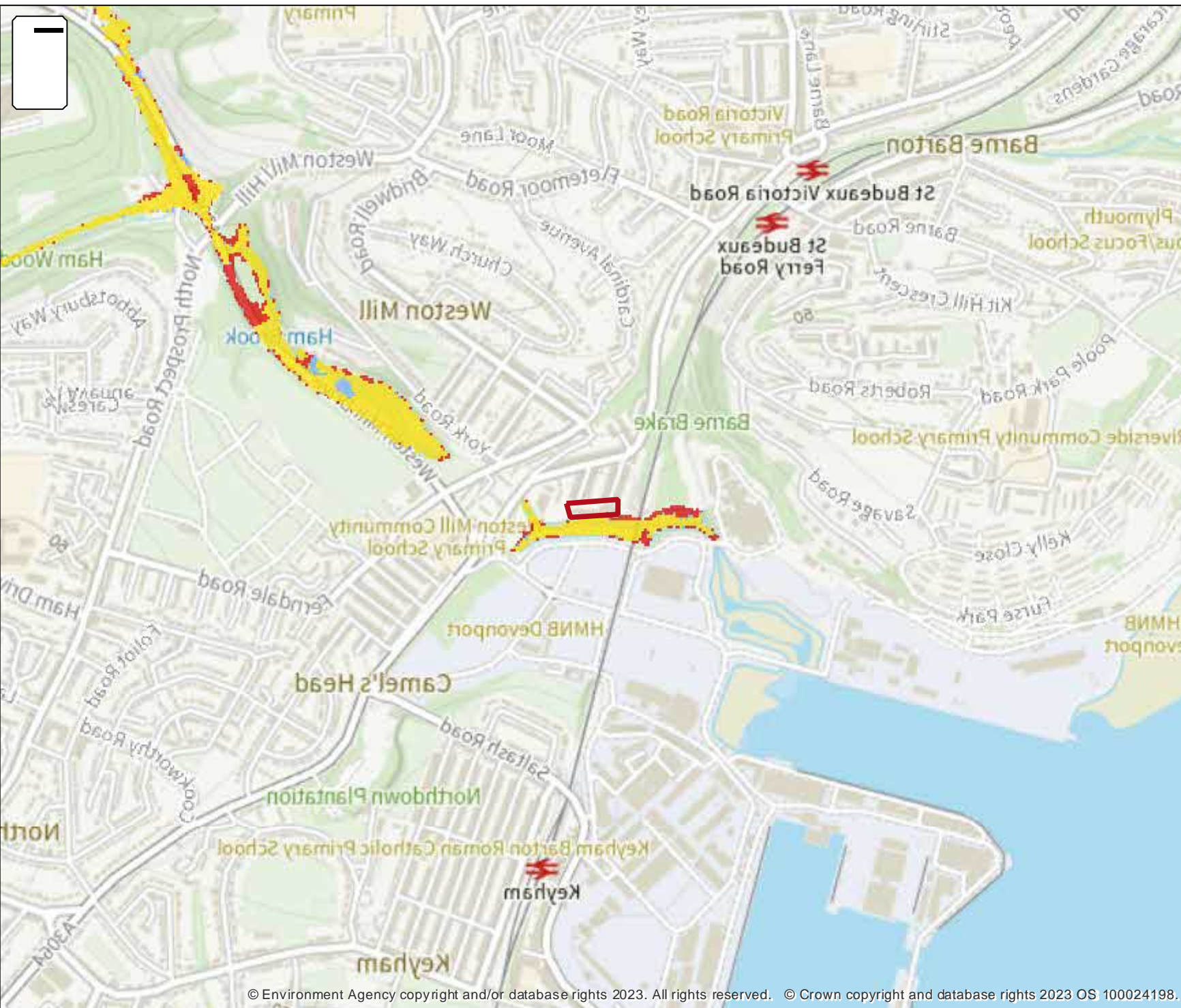
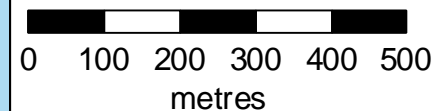
Location (easting/northing)
245032/57452

Scale Created
1:10,000 19 Dec 2023

Model name
JFLOW 2007 - area

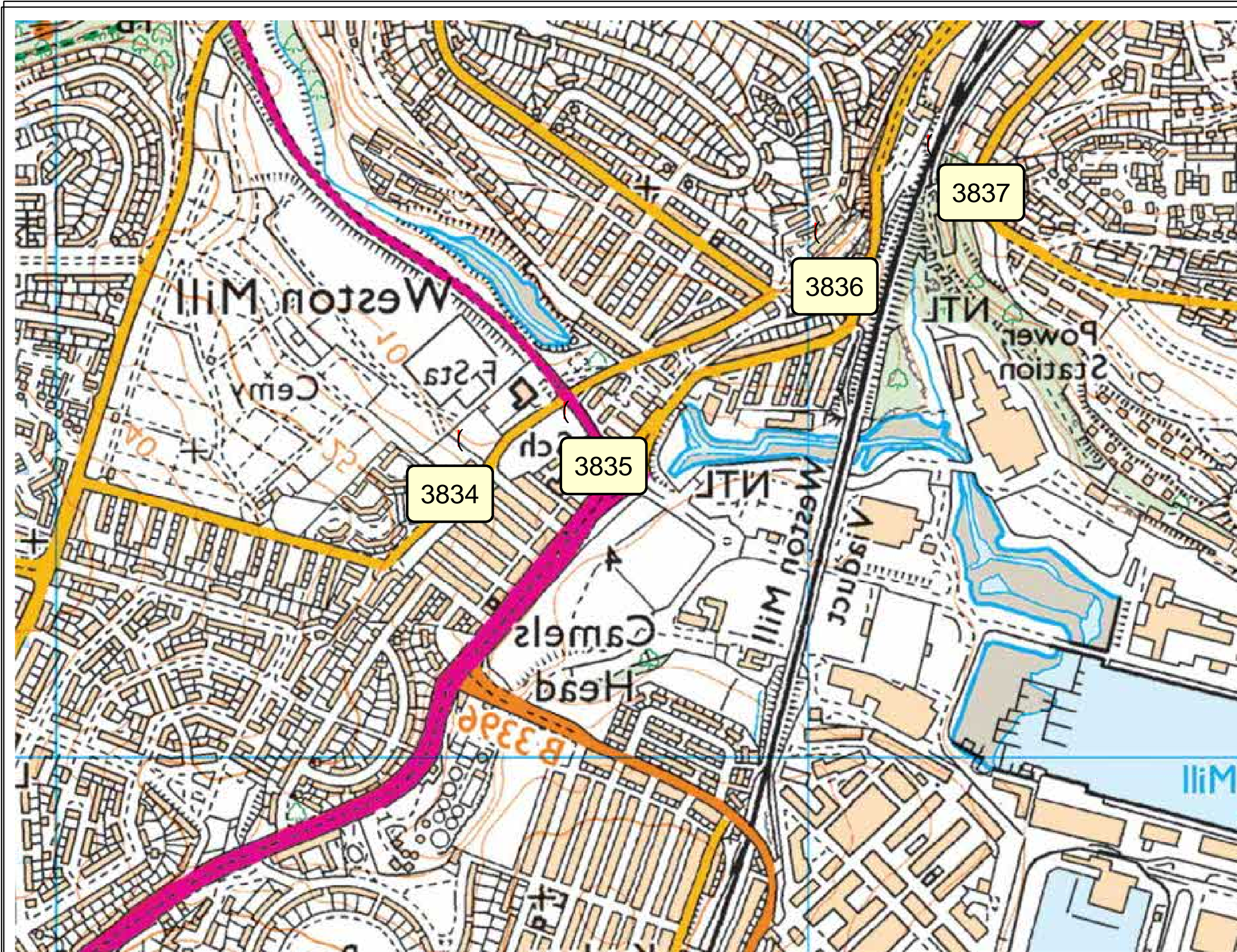
-  Selected area
- Modelled flood extent
 -  1.33% AEP
 -  1% AEP
 -  0.1% AEP

Flood extents may not be visible where they overlap other return periods



339308 - JFLOW Node Location Map

Please note this map is intended only as a guide - it is not accurate at individual property level



Legend

() JFLOW Node

Please refer to the enclosed table, for modelled water level data, and the enclosed caveat when considering modelled levels.

1:5,000 Correct as of the 19th December 2023

339308 - Modelled JFLOW Flood levels



This data is taken from the JFLOW model. Please refer to the attached caveat when considering JFLOW modelled levels.

Jflow Study: Jflow_2007

| Node Reference | Easting | Northing | Modelled Flood levels, in mAOD | |
|----------------|---------|----------|--------------------------------|------------------------------|
| | | | 1% AEP (1 in 100 year) | 0.1% AEP (1 in 1000 year) |
| 3834 | 245025 | 57426 | 1.53 | 2.64 |
| 3835 | 245166 | 57463 | 1.39 | 1.76 |
| 3836 | 245500 | 57702 | 2.53 | 4.02 |
| 3837 | 245650 | 57819 | 8.02 | 8.02 |

Correct as of 19 / 12 / 2023

Defended modelled tidal extent and height

Location (easting/northing)
245032/57452

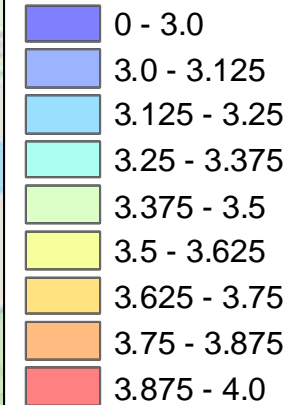
Scale Created
1:1,000 19 Dec 2023

Model name
Plymouth Coastal

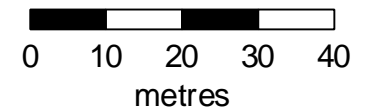
 Selected area

 Main river

Modelled 2D grid
Water level in mAOD



This map shows the
0.1% AEP height data



| Label | Easting | Northing | 5% AEP | | 2% AEP | | 1.33% AEP | | 1% AEP | | 0.5% AEP | | 0.1% AEP | |
|-------|---------|----------|--------|--------|--------|--------|-----------|--------|--------|--------|----------|--------|----------|--------|
| | | | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height |
| 17 | 244987 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 18 | 245003 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 19 | 245019 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 20 | 245035 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 21 | 245051 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 22 | 245067 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 23 | 245083 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 24 | 245003 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 25 | 245019 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 26 | 245035 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 27 | 245051 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 28 | 245067 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 29 | 245083 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |

Data in this table comes from the Plymouth Coastal 2018 model.

Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

Defences removed modelled tidal extent and height

Location (easting/northing)
245032/57452

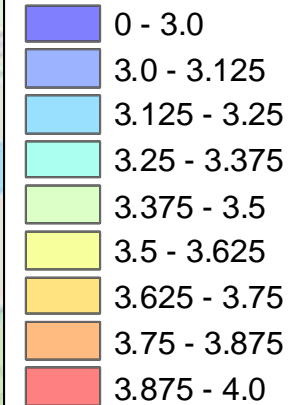
Scale Created
1:1,000 19 Dec 2023

Model name
Plymouth Coastal

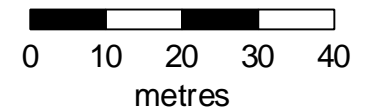
 Selected area

 Main river

Modelled 2D grid
Water level in mAOD



This map shows the
0.1% AEP height data



Sample point data

Defences removed

| Label | Easting | Northing | 5% AEP | | 2% AEP | | 1.33% AEP | | 1% AEP | | 0.5% AEP | | 0.1% AEP | |
|-------|---------|----------|--------|--------|--------|--------|-----------|--------|--------|--------|----------|--------|----------|--------|
| | | | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height |
| 1 | 244987 | 57428 | | | | | | | | | 2.61 | 3.53 | 2.71 | 3.64 |
| 2 | 245003 | 57428 | | | | | | | | | 3.11 | 3.53 | 3.21 | 3.64 |
| 3 | 245019 | 57428 | | | | | | | | | 3.28 | 3.54 | 3.38 | 3.64 |
| 4 | 245035 | 57428 | | | | | | | | | 3.53 | 3.54 | 3.63 | 3.64 |
| 5 | 245051 | 57428 | | | | | | | | | 3.58 | 3.54 | 3.68 | 3.64 |
| 6 | 245067 | 57428 | | | | | | | | | 3.22 | 3.54 | 3.32 | 3.64 |
| 7 | 245083 | 57428 | | | | | | | | | 1.83 | 3.54 | 1.93 | 3.64 |
| 8 | 244971 | 57444 | | | | | | | | | NoData | NoData | NoData | NoData |
| 9 | 244987 | 57444 | | | | | | | | | NoData | NoData | NoData | NoData |
| 10 | 245003 | 57444 | | | | | | | | | 0.21 | 3.54 | 0.31 | 3.64 |
| 11 | 245019 | 57444 | | | | | | | | | 0.38 | 3.54 | 0.47 | 3.64 |
| 12 | 245035 | 57444 | | | | | | | | | 0.75 | 3.54 | 0.85 | 3.64 |
| 13 | 245051 | 57444 | | | | | | | | | 0.43 | 3.54 | 0.51 | 3.64 |
| 14 | 245067 | 57444 | | | | | | | | | NoData | NoData | 0.27 | 3.64 |
| 15 | 245083 | 57444 | | | | | | | | | NoData | NoData | NoData | NoData |
| 16 | 244971 | 57460 | | | | | | | | | NoData | NoData | NoData | NoData |

| Label | Easting | Northing | 5% AEP | | 2% AEP | | 1.33% AEP | | 1% AEP | | 0.5% AEP | | 0.1% AEP | |
|-------|---------|----------|--------|--------|--------|--------|-----------|--------|--------|--------|----------|--------|----------|--------|
| | | | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height |
| 17 | 244987 | 57460 | | | | | | | | | NoData | NoData | NoData | NoData |
| 18 | 245003 | 57460 | | | | | | | | | NoData | NoData | NoData | NoData |
| 19 | 245019 | 57460 | | | | | | | | | NoData | NoData | NoData | NoData |
| 20 | 245035 | 57460 | | | | | | | | | NoData | NoData | NoData | NoData |
| 21 | 245051 | 57460 | | | | | | | | | NoData | NoData | NoData | NoData |
| 22 | 245067 | 57460 | | | | | | | | | NoData | NoData | NoData | NoData |
| 23 | 245083 | 57460 | | | | | | | | | NoData | NoData | NoData | NoData |
| 24 | 245003 | 57476 | | | | | | | | | NoData | NoData | NoData | NoData |
| 25 | 245019 | 57476 | | | | | | | | | NoData | NoData | NoData | NoData |
| 26 | 245035 | 57476 | | | | | | | | | NoData | NoData | NoData | NoData |
| 27 | 245051 | 57476 | | | | | | | | | NoData | NoData | NoData | NoData |
| 28 | 245067 | 57476 | | | | | | | | | NoData | NoData | NoData | NoData |
| 29 | 245083 | 57476 | | | | | | | | | NoData | NoData | NoData | NoData |

Data in this table comes from the Plymouth Coastal 2018 model.

Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

Defended climate change modelled tidal extent and height

Location (easting/northing)
245032/57452










Scale Created
1:1,000 19 Dec 2023

Model name
Plymouth Coastal

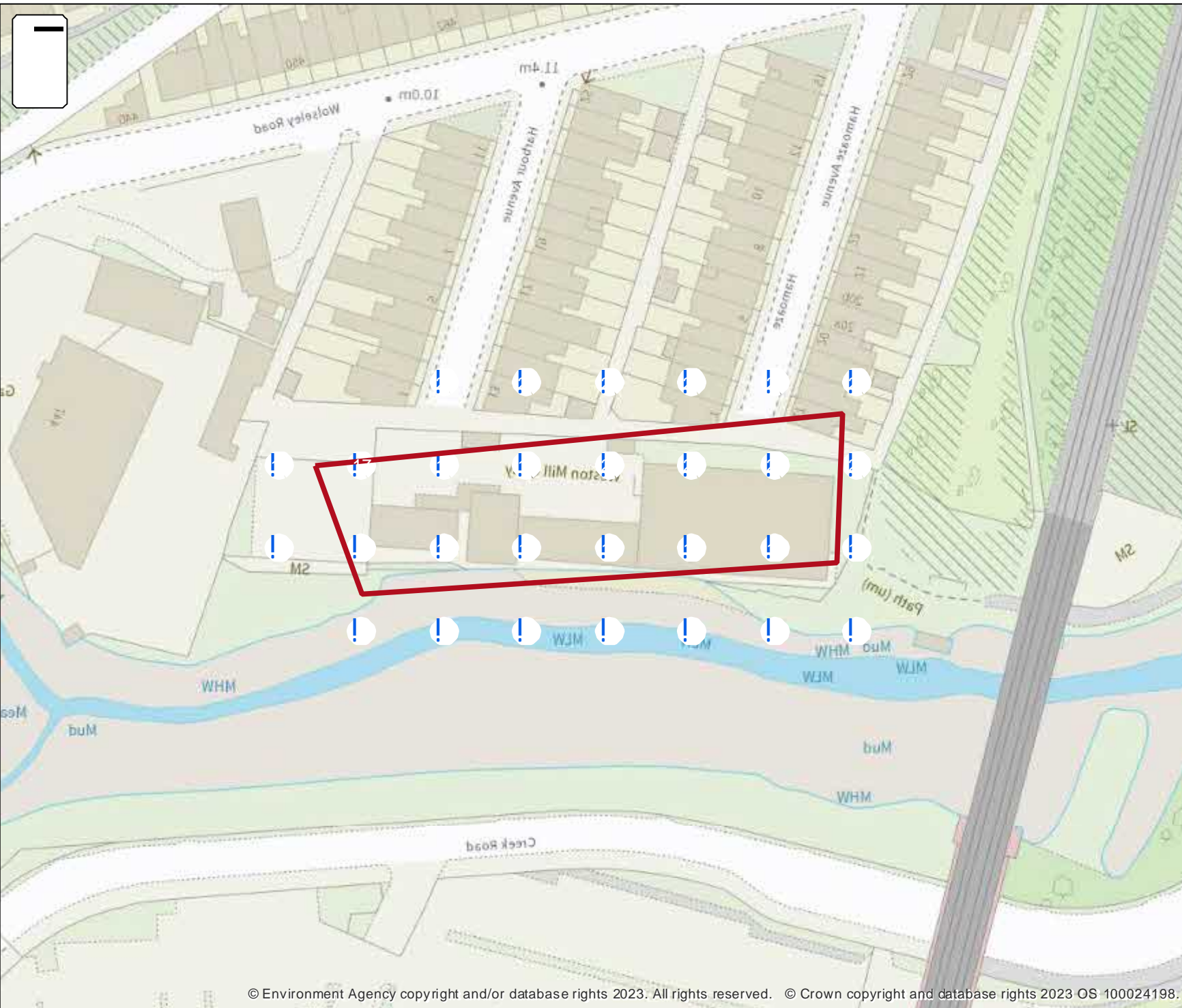
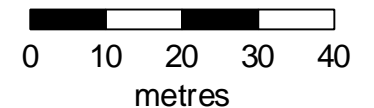
 Selected area

 Main river

Modelled 2D grid
Water level in mAOD

-  0 - 4.0
-  4.0 - 4.125
-  4.125 - 4.25
-  4.25 - 4.375
-  4.375 - 4.5
-  4.5 - 4.625
-  4.625 - 4.75
-  4.75 - 4.875
-  4.875 - 5.0

This map shows the
0.1% AEP +780mm height data



Sample point data

Defended climate change

| Label | Easting | Northing | 1% AEP (+350mm) | | 1% AEP (+780mm) | | 0.5% AEP (+350mm) | | 0.5% AEP (+780mm) | | 0.5% AEP (+1080mm) | | 0.1% AEP (+350mm) | | 0.1% AEP (+780mm) | |
|-------|---------|----------|-----------------|--------|-----------------|--------|-------------------|--------|-------------------|--------|--------------------|--------|-------------------|--------|-------------------|--------|
| | | | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height |
| 1 | 244987 | 57428 | 2.88 | 3.80 | 3.26 | 4.18 | 2.96 | 3.88 | 3.37 | 4.30 | 3.60 | 4.52 | 3.10 | 4.02 | 3.53 | 4.45 |
| 2 | 245003 | 57428 | 3.38 | 3.80 | 3.76 | 4.18 | 3.46 | 3.88 | 3.88 | 4.30 | 4.10 | 4.53 | 3.60 | 4.02 | 4.03 | 4.45 |
| 3 | 245019 | 57428 | 3.55 | 3.80 | 3.93 | 4.19 | 3.62 | 3.88 | 4.04 | 4.30 | 4.27 | 4.53 | 3.77 | 4.02 | 4.19 | 4.45 |
| 4 | 245035 | 57428 | 3.79 | 3.81 | 4.18 | 4.19 | 3.87 | 3.88 | 4.29 | 4.30 | 4.52 | 4.53 | 4.01 | 4.03 | 4.44 | 4.45 |
| 5 | 245051 | 57428 | 3.84 | 3.81 | 4.23 | 4.19 | 3.92 | 3.88 | 4.34 | 4.30 | 4.57 | 4.53 | 4.07 | 4.03 | 4.49 | 4.45 |
| 6 | 245067 | 57428 | 3.49 | 3.81 | 3.87 | 4.19 | 3.57 | 3.89 | 3.99 | 4.30 | 4.21 | 4.53 | 3.71 | 4.03 | 4.14 | 4.45 |
| 7 | 245083 | 57428 | 2.10 | 3.81 | 2.48 | 4.19 | 2.17 | 3.89 | 2.59 | 4.30 | 2.82 | 4.53 | 2.32 | 4.03 | 2.74 | 4.45 |
| 8 | 244971 | 57444 | NoData | NoData | 0.18 | 4.18 | 0.04 | 3.88 | 0.23 | 4.30 | 0.34 | 4.52 | 0.10 | 4.02 | 0.30 | 4.45 |
| 9 | 244987 | 57444 | NoData | NoData | NoData | NoData | NoData | NoData | 0.11 | 4.30 | 0.34 | 4.53 | NoData | NoData | 0.26 | 4.45 |
| 10 | 245003 | 57444 | 0.48 | 3.80 | 0.86 | 4.19 | 0.56 | 3.88 | 0.98 | 4.30 | 1.20 | 4.53 | 0.70 | 4.02 | 1.13 | 4.45 |
| 11 | 245019 | 57444 | 0.64 | 3.81 | 1.02 | 4.19 | 0.72 | 3.88 | 1.13 | 4.30 | 1.36 | 4.53 | 0.86 | 4.03 | 1.28 | 4.45 |
| 12 | 245035 | 57444 | 1.02 | 3.81 | 1.40 | 4.19 | 1.10 | 3.88 | 1.52 | 4.30 | 1.74 | 4.53 | 1.24 | 4.03 | 1.67 | 4.45 |
| 13 | 245051 | 57444 | 0.68 | 3.81 | 1.06 | 4.19 | 0.76 | 3.89 | 1.17 | 4.30 | 1.40 | 4.53 | 0.90 | 4.03 | 1.32 | 4.45 |
| 14 | 245067 | 57444 | 0.42 | 3.81 | 0.80 | 4.19 | 0.50 | 3.89 | 0.92 | 4.30 | 1.14 | 4.53 | 0.64 | 4.03 | 1.07 | 4.45 |
| 15 | 245083 | 57444 | NoData | NoData | 0.36 | 4.19 | NoData | NoData | 0.48 | 4.30 | 0.70 | 4.53 | 0.20 | 4.03 | 0.63 | 4.45 |
| 16 | 244971 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 17 | 244987 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData | 0.00 | 4.19 | 0.34 | 4.53 | NoData | NoData | 0.26 | 4.45 |

| Label | Easting | Northing | 1% AEP (+350mm) | | 1% AEP (+780mm) | | 0.5% AEP (+350mm) | | 0.5% AEP (+780mm) | | 0.5% AEP (+1080mm) | | 0.1% AEP (+350mm) | | 0.1% AEP (+780mm) | |
|-------|---------|----------|-----------------|--------|-----------------|--------|-------------------|--------|-------------------|--------|--------------------|--------|-------------------|--------|-------------------|--------|
| | | | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height |
| 18 | 245003 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData | 0.05 | 4.30 | 0.25 | 4.53 | NoData | NoData | 0.17 | 4.45 |
| 19 | 245019 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | 0.30 | 4.53 | NoData | NoData | 0.22 | 4.45 |
| 20 | 245035 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | 0.23 | 4.53 | NoData | NoData | 0.16 | 4.45 |
| 21 | 245051 | 57460 | NoData | NoData | 0.13 | 4.19 | NoData | NoData | 0.24 | 4.30 | 0.45 | 4.53 | NoData | NoData | 0.38 | 4.45 |
| 22 | 245067 | 57460 | NoData | NoData | 0.19 | 4.19 | NoData | NoData | 0.31 | 4.31 | 0.53 | 4.53 | 0.05 | 4.03 | 0.46 | 4.46 |
| 23 | 245083 | 57460 | NoData | NoData | 0.17 | 4.19 | NoData | NoData | 0.28 | 4.31 | 0.50 | 4.53 | 0.04 | 4.03 | 0.43 | 4.46 |
| 24 | 245003 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 25 | 245019 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 26 | 245035 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 27 | 245051 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 28 | 245067 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 29 | 245083 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData | 0.06 | 4.53 | NoData | NoData | NoData | NoData |

Data in this table comes from the Plymouth Coastal 2018 model.

Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

Defences removed climate change modelled tidal extent and height

Location (easting/northing)
245032/57452










Scale Created
1:1,000 19 Dec 2023

Model name
Plymouth Coastal

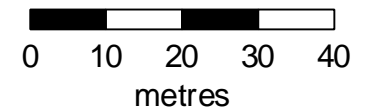
 Selected area

 Main river

Modelled 2D grid
Water level in mAOD

-  0 - 4.0
-  4.0 - 4.125
-  4.125 - 4.25
-  4.25 - 4.375
-  4.375 - 4.5
-  4.5 - 4.625
-  4.625 - 4.75
-  4.75 - 4.875
-  4.875 - 5.0

This map shows the
0.5% AEP +1080mm height data



Sample point data

Defences removed climate change

| Label | Easting | Northing | 0.5% AEP (+350mm) | | 0.5% AEP (+780mm) | | 0.5% AEP (+1080mm) | |
|-------|---------|----------|-------------------|--------|-------------------|--------|--------------------|--------|
| | | | Depth | Height | Depth | Height | Depth | Height |
| 1 | 244987 | 57428 | 2.95 | 3.87 | 3.36 | 4.29 | 3.60 | 4.53 |
| 2 | 245003 | 57428 | 3.45 | 3.87 | 3.86 | 4.29 | 4.10 | 4.53 |
| 3 | 245019 | 57428 | 3.61 | 3.87 | 4.03 | 4.29 | 4.27 | 4.53 |
| 4 | 245035 | 57428 | 3.86 | 3.87 | 4.28 | 4.29 | 4.52 | 4.53 |
| 5 | 245051 | 57428 | 3.91 | 3.87 | 4.33 | 4.29 | 4.57 | 4.53 |
| 6 | 245067 | 57428 | 3.56 | 3.87 | 3.97 | 4.29 | 4.21 | 4.53 |
| 7 | 245083 | 57428 | 2.16 | 3.87 | 2.58 | 4.29 | 2.82 | 4.53 |
| 8 | 244971 | 57444 | 0.03 | 3.87 | 0.22 | 4.29 | 0.34 | 4.53 |
| 9 | 244987 | 57444 | NoData | NoData | 0.10 | 4.29 | 0.34 | 4.53 |
| 10 | 245003 | 57444 | 0.55 | 3.87 | 0.96 | 4.29 | 1.20 | 4.53 |
| 11 | 245019 | 57444 | 0.70 | 3.87 | 1.12 | 4.29 | 1.36 | 4.53 |
| 12 | 245035 | 57444 | 1.09 | 3.87 | 1.50 | 4.29 | 1.74 | 4.53 |
| 13 | 245051 | 57444 | 0.74 | 3.87 | 1.16 | 4.29 | 1.40 | 4.53 |
| 14 | 245067 | 57444 | 0.49 | 3.87 | 0.90 | 4.29 | 1.14 | 4.53 |
| 15 | 245083 | 57444 | NoData | NoData | 0.46 | 4.29 | 0.70 | 4.53 |
| 16 | 244971 | 57460 | NoData | NoData | NoData | NoData | NoData | NoData |

| Label | Easting | Northing | 0.5% AEP (+350mm) | | 0.5% AEP (+780mm) | | 0.5% AEP (+1080mm) | |
|-------|---------|----------|-------------------|--------|-------------------|--------|--------------------|--------|
| | | | Depth | Height | Depth | Height | Depth | Height |
| 17 | 244987 | 57460 | NoData | NoData | NoData | NoData | 0.34 | 4.53 |
| 18 | 245003 | 57460 | NoData | NoData | 0.05 | 4.29 | 0.25 | 4.53 |
| 19 | 245019 | 57460 | NoData | NoData | NoData | NoData | 0.30 | 4.53 |
| 20 | 245035 | 57460 | NoData | NoData | NoData | NoData | 0.23 | 4.53 |
| 21 | 245051 | 57460 | NoData | NoData | 0.23 | 4.29 | 0.45 | 4.53 |
| 22 | 245067 | 57460 | NoData | NoData | 0.29 | 4.29 | 0.53 | 4.53 |
| 23 | 245083 | 57460 | NoData | NoData | 0.26 | 4.29 | 0.50 | 4.53 |
| 24 | 245003 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData |
| 25 | 245019 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData |
| 26 | 245035 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData |
| 27 | 245051 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData |
| 28 | 245067 | 57476 | NoData | NoData | NoData | NoData | NoData | NoData |
| 29 | 245083 | 57476 | NoData | NoData | NoData | NoData | 0.05 | 4.53 |

Data in this table comes from the Plymouth Coastal 2018 model.

Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

[Find out more about flood risk activity permits](#)

Help and advice

Contact the Devon Cornwall and the Isles of Scilly Environment Agency team at dcisenquiries@environment-agency.gov.uk for:

- [more information about getting a product 5, 6, 7 or 8](#)
- general help and advice about the site you're requesting data for

Pre-planning application Guidance Note: Devon, Cornwall & Isles of Scilly Area

Last Updated: September 2022

This guidance has been produced to help you plan and prepare your development proposal.

It sets out the environmental issues we expect to be considered as part of a planning application. Please be aware that this guide is not exhaustive and further details may be requested by us at planning application stage to address site specific environmental issues.

This guidance is only for use in the Environment Agency's Devon, Cornwall and Isles of Scilly Area and should be read alongside our detailed national guidance which can be found on the GOV.UK website.

It can be used by applicants, developers and consultants at the pre-planning stage.

Further bespoke advice

The information provided below details generic information which may or may not be applicable to your development. We can provide bespoke guidance or review technical information prior to the submission of a planning application. This is part of our charged service, which equates to £100 per person per hour plus VAT.

Further engagement at the pre-application stage will speed up our formal response to your planning application and provide you with certainty as to what our response to your planning application will be. It should also result in a better quality and more environmentally sensitive development. As part of our charged for service we will provide a dedicated project manager to act as a single point of contact to help resolve any problems.

If you are interested in finding out more about this service, please email: SPDC@environment-agency.gov.uk.

We also recommend that you consult with the relevant Local Planning Authority (LPA) to ensure that your planning application meets their requirements.

Section 1: Flood Risk

The National Planning Policy Framework (NPPF) requires development in areas at risk of flooding to be safe and not increase the risk of flooding.

You can view a site's flood zone on the [Flood Map for Planning](#). If your proposed development is located within Flood Zone 2 or 3 you should consult the [Flood Risk and Coastal Change](#) pages of the National Planning Practice Guidance (NPPG).

The guidance will help you determine whether the flood risk vulnerability of your proposed development and the flood zone are compatible. You can also establish if there are flood risk sequential test and exception test requirements for your proposed development. These are summarised in the table below, which is adapted from [Table 3](#) in the NPPG.

| Flood Zones | Flood Risk Vulnerability Classification | | | | |
|----------------|--|--|--|--|--|
| | Essential infrastructure | Highly vulnerable | More vulnerable | Less vulnerable | Water compatible |
| Zone 1 | ✓ Avoid flood risk from sources other than rivers & sea | ✓ Avoid flood risk from sources other than rivers & sea | ✓ Avoid flood risk from sources other than rivers & sea | ✓ Avoid flood risk from sources other than rivers & sea | ✓ Avoid flood risk from sources other than rivers & sea |
| Zone 2 | ? Sequential Test required | ? Sequential and Exception Tests required | ? Sequential Test required | ? Sequential Test required | ? Sequential Test required |
| Zone 3a | ? Sequential and Exception Tests required | X Development should not be permitted | ? Sequential and Exception Tests required | ? Sequential Test required | ? Sequential Test required |
| Zone 3b | ? Sequential and Exception Tests required | X Development should not be permitted | X Development should not be permitted | X Development should not be permitted | ? Sequential Test required |

1.1 Sequential Test

The NPPF and associated NPPG ([Flood Risk and Coastal Change](#) chapter) requires the Sequential Test to be applied to planning applications where development is located within Flood Zone 2, 3a or 3b in the circumstances shown in the table above. The only exceptions are sites allocated in an adopted Local Plan which have already been subject to the test, change of use or [minor development](#).

For the site to pass the Sequential Test it must be satisfactorily demonstrated to the LPA that there are no appropriate alternative sites available for this development at a lower risk of flooding. It is for the LPA to determine if the Sequential Test has to be applied and whether or not there are other sites available at lower flood risk. Therefore, we recommend that you discuss the requirements of the Sequential Test with the LPA at the earliest opportunity.

1.2 Sequential Approach

If the Sequential Test is passed then a sequential approach should be applied within the site to direct development to the areas of lowest flood risk (Flood Zone 1 first, followed by Flood Zone 2). If it is not possible to locate all of the development within Flood Zone 1, then the most vulnerable elements of the development should be located in the lowest risk parts of the site.

1.3 Exception Test

The Exception Test should only be applied in the circumstances shown in the table above following application of the sequential test. The Exception Test should not be used to justify the grant of planning permission in flood risk areas when the Sequential Test has not been satisfied.

The Exception Test is in two parts and both need to be met for the test to be satisfied. It is for the applicant to demonstrate this to the LPA, but we will provide advice on the second part of the test. The second part requires a site-specific flood risk assessment (FRA) to demonstrate that the new development will be safe over its lifetime (including access and egress), will not increase flood risk elsewhere and, where possible, will reduce flood risk overall. The NPPF states that both parts of this test should be satisfied for development to be permitted.

1.4 Inappropriate development in areas at risk of flooding

[Table 3](#) in the NPPG sets out the circumstances where development is inappropriate and should not be permitted.

Flood Zone 3b is land classed as the 'functional floodplain' and is land defined by an LPA's Strategic Flood Risk Assessment (SFRA) as having the highest probability of flooding, and where water has to flow or be stored in times of flood. Only water compatible development and essential infrastructure (subject to the Exception Test) can be acceptable within the functional floodplain.

We would **object in principle** to any development that falls under any other vulnerability classification. It is important to note that the functional floodplain is not separately distinguished from Zone 3a on the Flood Map for Planning. Instead, areas of functional floodplain have been identified by LPAs within their SFRA's.

Highly vulnerable development, which includes caravans, mobile homes and park homes intended for permanent residential use and basement dwellings, is also not acceptable in Flood Zone 3a.

1.5 Flood Risk Assessment (FRA) Requirements

A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3 in accordance with paragraph 167, footnote 55 of the [National Planning Policy Framework](#) (NPPF). In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

In accordance with the NPPF and associated NPPG, a site specific FRA must clearly demonstrate how you intend to manage flood risk on site to ensure that the proposed development will be safe for its lifetime and that flood risk is not increased on site and elsewhere.

The FRA should be appropriate to the scale, nature and location of the development. While it is possible for applicants to undertake their own assessment, most employ suitably experienced professionals. We are not able to recommend specific consultants, but details of competent individuals or companies can be found online.

We would expect your FRA to address (but not necessarily be limited to) the following issues:

Consideration of the level of flood risk and whether the proposed use would be appropriate in accordance with its vulnerability classification outlined within [Table 2](#) of the Planning Practice Guidance: [Flood Risk and Coastal Change](#) (section 25).

Identification of the level of flood risk on the site and consideration of the impact a range of flood events would have on the proposed development, including an assessment of the impacts of climate change by selecting the appropriate climate change allowances.

Confirmation of any flood defences and standard of protection provided, to confirm the level of residual risk in accordance with the Strategic Flood Risk Assessment (SFRA) for the local planning authority in which the development is located.

Estimation of flood depths at the site for a range of flood events, to calculate internal flood depths and level of refuge required in the event of a breach or failure of the flood defences.

Appropriate and realistic flood mitigation measures based on flood characteristics at site.

Details of set back of the development from the riverbank / defence.

Confirmation that a safe route of access and egress with a 'very low flood hazard' rating in accordance with the guidance document '[FD2320 \(Flood Risk Assessment Guidance for New Developments\)](#)' is achievable.

For further information on our flood map products please visit our [website](#). Guidance on the content of a site-specific FRA can be found on the NPPG and at [gov.uk](#).

We can provide any flood risk information which we have available – such as predicted flood levels and historical flood data – for use in FRAs. Please contact our Customers and Engagement Team at DCISEnquiries@environment-agency.gov.uk for further details.

1.6 Modelling

In some instances a detailed hydraulic model or flood modelling work may be necessary, in particular if there is no available data for the area of your planning application or to take into account correct climate change allowances. Please be aware that if you are required to carry out flood modelling as part of your proposal you will need to submit the flood model files to the LPA as part of your planning application, which will then need to be reviewed by us.

Where modelling is required, we advise you to contact us ahead of submitting your planning application to discuss your modelling requirements and avoid delays when you submit your planning application.

1.7 Climate Change Allowances

In order to demonstrate the risks to the proposal over its lifetime, a site-specific FRA must also consider the impact of climate change on future flood risks. The latest guidance on how to apply the correct, up to date climate change allowance for FRAs is available at [gov.uk](#).

1.8 Finished Floor Levels

Raising floor levels above the design flood level is the most effective means of ensuring development will not be subject to internal flooding. The finished floor levels of new buildings in areas at a high risk of flooding should be at least 300 millimetres above the design flood level, including an allowance for climate change. Where this cannot be achieved due to other planning constraints, we request that floor levels are set as high as possible (for extensions to existing buildings, no lower than the existing floor levels) and that flood resilience/resistance measures are considered, where appropriate, up to the design flood level.

Where floor levels cannot be raised sufficiently, consideration should be given to the use of flood resilient construction practices and materials in the design and build phase. Choice of materials and simple design modifications can make the development more resistant to flooding and reduce rehabilitation time in the event of future inundation. We may object unless it can be demonstrated that the safety of occupants can be managed by including other flood resilience/resistance measures up to the design flood level.

Detailed information on flood proofing and mitigation can be found on the gov.uk website in the documents [‘Improving the Flood performance of new buildings’](#) and [‘Prepare your property for flooding’](#).

1.9 Floodplain Compensation

Your FRA will need to demonstrate that any increase in built footprint within the 1 in 100 year plus climate change flood extent can be directly compensated for, on a volume-for-volume and level-for-level basis to prevent a loss of floodplain storage. If it is not possible to provide level for level flood plain compensation, other forms of mitigation may be considered if agreed with the LPA or there should be no increase in built footprint. It will also need to be demonstrated that the proposed development does not impact the flow and conveyance of water.

The use of voids, stilts or under-croft parking as mitigation for a loss in floodplain storage should be avoided, as they may become blocked over time by debris or domestic effects. We would not recommend these methods to the LPA as an acceptable means of compensation.

1.10 Safe Access

During a flood, the journey to safe, dry areas completely outside the 1 in 100 year plus climate change flood extent would involve crossing areas of potentially fast flowing water. Those evacuating on foot in areas where flooding exceeds 100 millimetres or so would be at risk from a wide range of hazards, including for example unmarked drops, or access chambers where the cover has been swept away.

Where safe access cannot be achieved, an emergency flood plan that deals with matters of evacuation and refuge to demonstrate that people will not be exposed to flood hazards should be submitted to and agreed with the LPA.

We recommend that you discuss safe access and egress routes with the local authority emergency planners, as they will be responsible for agreeing to any emergency plan submitted with your application.

1.11 Flood Defences

It should be demonstrated that any flood walls/defences are in good enough condition to protect the proposed development for its lifetime. This is usually 100 years for residential development. This should be submitted in the form of a survey and should include an assessment of any remedial works or flood defence replacement options required to protect the site from flooding for the lifetime of the development.

The FRA should assess the impacts of a failing flood defence (for example, a breach scenario) on the proposed development and demonstrate that there will not be an unacceptable risk of flooding.

1.12 Critical Drainage Areas

A Critical Drainage Area (CDA) is defined as an area (including areas within Flood Zone 1) which has critical drainage problems, as notified to the local planning authority by the Environment Agency. Within such areas developments may present significant risks of flooding on-site and/or off-site if surface water run-off is not effectively managed. Within CDAs development is therefore expected to meet tighter drainage standards. In accordance with Paragraph 167, footnote 55 of the NPPF, applicants for planning permission are required to submit an appropriate FRA when development is proposed in such locations.

The responsibility for determining whether surface water drainage proposals are appropriate rest with the relevant Lead Local Flood Authority (LLFA). There are four LLFAs within Devon and Cornwall (Cornwall Council, Devon County Council, Plymouth City Council and Torbay Council). The CDAs that have been notified in each LLFA area are listed below. For further information please contact the LLFAs directly.

| |
|--|
| Cornwall LLFA floodrisk@cornwall.gov.uk |
| Bodmin – Bude – Camborne, Pool, Illogan & Redruth – Falmouth & Penryn – Flexbury – Hayle – Helston – Launceston – Liskeard – Lostwithiel – Padstow – Penzance and Newlyn – Saltash (Latchbrook Leat) – St Austell – St Blazey – St Ives – Truro (Kenwyn, Allen & Tregolls Rd and Tinney) – Wadebridge |
| Devon LLFA floodrisk@devon.gov.uk |
| Ashburton – Axminster – Barnstaple (southwest and east) – Bideford – Bovey Tracey – Cullompton – Dawlish Warren – East the Water – Feniton – Fremington and Yelland – Holbeam Dam (River Lemon) – Holsworthy – Ilfracombe and Hele – Ivybridge – Kingsbridge – Modbury – Okehampton – Palmers Dam (River Harbourne) – Tavistock – Totnes (Bridgetown & Warlands) – Whimble |
| Plymouth LLFA FloodRiskTeam@plymouth.gov.uk |
| All areas of the city except Ernesettle, Whitleigh, Woolwell, Glenholt, Mainstone and Plymstock |
| Torbay LLFA highways@torbay.gov.uk |
| All areas of Torbay |

1.13 Flood Risk Standing Advice for lower risk development

We have produced a series of standard comments for LPAs and applicants to refer to for lower risk development proposals. These comments replace direct consultation with us. These standard comments are known as Flood Risk Standing Advice (FRSA), and can be found on gov.uk. We recommend that you view our standing advice in full before submitting the required information as part of a planning application. The LPA will then determine whether flood risk has been considered in line with FRSA recommendations.

Within Devon, Cornwall and Isles of Scilly Area we have also produced Local Flood Risk Standing Advice (LFRSA). The LFRSA covers non-major changes of use to residential uses (i.e. less than 10 dwellings) and replacement dwellings in areas at risk of flooding. We will issue the relevant LFRSA guidance notes directly to Local Planning Authorities when consulted on these proposals.

Section 2: Main Rivers & Ecology

2.1 Flood Risk Activity Permit

The Environmental Permitting (England and Wales) Regulations 2016 require a permit to be obtained for any activities which will take place:

in, over or under a main river
on or within 8 metres of the bank of a main river, or 16 metres if it is a tidal main river
on or within 8 metres of any flood defence structure or culvert on a main river, or 16m for a tidal main river or sea defence
involving quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert
in a floodplain more than 8 metres from the riverbank, culvert or flood defence structure (16 metres if it is a tidal main river) without planning permission.

Flood risk activities can be classified as: Exclusions, Exemptions, Standard Rules or Bespoke. These are associated with the level of risk your proposed works may pose to people, property and the environment. Further guidance on applying for flood risk activity permits can be found [online](#).

To identify any Main Rivers in proximity to your proposed development please check our Flood Map for Planning.

Where a Flood Risk Activity Permit (FRAP) is required, it is unlikely that our consent will be granted for works that do not allow access for maintenance or repair purpose or that have an unacceptable impact on flood risk or the natural environment. The permanent retention of a continuous unobstructed area is an essential requirement for emergency access to the river for repairs to the bank and for future maintenance and/or improvement works.

Where development or works are proposed that would require a FRAP, it is recommended that detailed planning advice is obtained from us prior to the submission of a planning application. We may object to a planning application if we do not consider that we can issue a FRAP for a development as proposed. The determination of a planning application could be delayed until our concerns are resolved.

FRAPs are required irrespective of any planning permission and are not guaranteed. You should not assume that a permit will automatically be forthcoming once planning permission has been granted, and we advise you to consult with us at the earliest opportunity.

2.2 Ecological Enhancements & Biodiversity Net Gain

Paragraphs 174 and 179 of the National Planning Policy Framework (NPPF) recognise that the planning system should conserve and enhance the environment by minimising impacts on and providing net gains for biodiversity. If significant harm resulting from a development cannot be avoided, adequately mitigated, or as a last resort compensated for, planning permission should be refused.

We recommend that development proposals protect and enhance the local environment and seek opportunities to enhance ecology and provide Biodiversity Net Gains (BNG). The enhancement of

biodiversity in and around development should be led by a local understanding of ecological networks, and should seek to include:

- habitat restoration, re-creation and expansion;
- improved links between existing sites;
- buffering of existing important sites;
- new biodiversity features within development; and
- securing management for long term enhancement

2.3 River Naturalisation and Culverted Watercourses

Development on sites with existing culverts present opportunities for de-culverting as part of the proposal. Deculverting and river restoration will provide environmental improvements and contribute to the delivery of BNG, will help deliver [Water Framework Directive \(WFD\)](#) improvements and will also reduce the risk of flooding. We strongly recommend you consider all options to remove any culverted sections of watercourses as part of your development proposals, restoring the river to its natural state. If deculverting is not possible on the site we would expect to see adequate evidence for this.

We will object to any proposal to culvert main river watercourses. Development that involves culverting for land gain purposes is not sustainable. It works against the natural processes of watercourses and can exacerbate the risk of flooding and increase maintenance costs and complexity. It can also destroy wildlife habitats, hinder fish passage, reduce amenity value, interrupt the continuity of the linear corridor of a watercourse and affect channel stability. It can also significantly reduce resilience to the effects of drought, floods and pollution. Culverting an ordinary watercourse requires the prior consent of the Lead Local Flood Authority.

2.4 Buffer Zone

Development adjacent to main rivers should be designed with a naturalised buffer zone of at least 8 metres from the bank top or retaining wall to protect and enhance the conservation value of the watercourse and ensure access for flood defence maintenance. This increases to 16 metres for a tidal main river, and the requirement for a buffer zone also applies to culverted watercourses. Where such a buffer strip does not currently exist, we normally seek to ensure that it is established. In urban areas in particular, rivers have often been degraded by past development, and we expect that any new development should go some way to redress the balance.

The buffer zone should be designed and managed for the benefit of biodiversity and should be undisturbed by development with no fencing, footpaths or other structures. It should not include formal landscaping, and should include the planting of locally appropriate native species. Mowing regimes should be low intensity, allowing plants to flower. Light spill within the buffer zone from external artificial lights should be kept at an absolute minimum and be located and directed so that light levels of 0-2 lux are maintained. The buffer zone will help provide more space for flood waters, provide improved habitat for local biodiversity and allows access for any maintenance requirements.

We recommend that you submit a suitably scaled plan showing the distance of the new development from the watercourse.

2.5 Nature Conservation & Ecology Surveys

The presence of a main river on or within 8 metres of your proposed development site means an ecological survey should accompany your planning application to establish whether development is likely to have a detrimental impact on the biodiversity of the watercourse. We would not support development proposals if there was shown to be a likely detrimental impact on the water environment. In accordance with the NPPF, any development proposal should avoid significant harm to biodiversity and seek to provide a net gain in biodiversity. Opportunities to incorporate biodiversity in and around the development will be encouraged where appropriate, see examples in our [Estuary Edges Guidance](#).

If there is the potential for protected species or habitats to be present on or adjacent to the site, as part of your planning application you will need to undertake the necessary ecological surveys / assessments to determine if they are present. Where protected species and / or habitats are present, detailed assessments and mitigation measures may be necessary. We may offer advice in relation to water-based species and / or habitats that are within our remit.

Where protected species or habitats are present, works may also require licensing from Natural England and therefore we recommend you contact Natural England for their advice.

You can find a full list of protected sites, species and the precautions required for planning on the [GOV.UK](#) website.

2.6 Water Framework Directive (WFD)

With any development alongside watercourses, consideration should be given to the requirements of the [Water Framework Directive](#) (WFD) which includes causing no overall deterioration in water quality or the ecological status of any waterbody.

Proposed development in close proximity to watercourses may require a [WFD compliance assessment](#). This must assess any potential impacts on the watercourses and demonstrate that the required enhancements will be delivered. Any development that has the potential to cause deterioration in classification under WFD or that precludes the recommended actions from being delivered in the future is likely to be considered unacceptable to us. You will find actions associated with the WFD by searching for your watercourse on the [EA Catchment Data Explorer](#). For further guidance on undertaking a WFD compliance assessment, please refer to [gov.uk](#).

2.7 Non-native Species

Development and construction activities may increase the risk of spreading invasive species present within a proposed development site. Where the presence of invasive species is known or suspected, prior to the commencement of development (including ground clearance) we would expect a detailed method statement for the removal or long-term management /eradication of the invasive species on the site to be submitted to and approved in writing by the LPA. This will help prevent the spread while work is being carried out and consider the longer-term management. When visiting any site, work methods must include appropriate biosecurity measures (considered for all potential spread pathways) to prevent the spread and introduction of invasive non-native species in order to avoid contravention of the Wildlife and Countryside Act 1981. Without this, avoidable damage could be caused to the nature conservation value of a site.

Section 3: Groundwater Quality and Contaminated Land

3.1 Land Affected by Contamination

The NPPF takes a precautionary approach to land contamination. Before the principle of development can be determined, land contamination should be investigated to see whether it could preclude certain development due to environmental risk or cost of remediation.

Where contamination is known or suspected, a desk study, site investigation, remediation and other works may be required to enable safe development (paragraph 183 of the NPPF). The minimum requirements for submission with a planning application are a preliminary risk assessment, such as a site walkover or desk top study.

Site Investigation and Remediation Strategy reports may be required for submission with a planning application for sensitive land use types or where significant contamination or uncertainty is found. Where these reports are missing or where they do not demonstrate no adverse impact on the environment, we are likely to raise an objection to the planning application.

If during site works contaminated material is suspected, you are advised to stop works and seek further guidance. Remediation of contaminated land may require a permit under Environmental Permitting Regulations.

When dealing with land affected by contamination, developers should follow the risk management framework provided in 'Model procedures for the management of land contamination' ([CLR11](#)).

Please also note that any surface water drainage system must not pose a risk to groundwater quality and must not be constructed in ground affected by contamination.

Further guidance can be found at:

What is [contaminated land](#)?

[NPPF: Land affected by contamination](#)

[Environment Agency Land contamination: technical guidance](#)

[Land contamination risk assessment](#)

We recommend you contact your Local Authority's Environmental Health team who may hold records on known/potential land contamination. Please note our primary concern is with regards to water quality. Your Local Authority's Environmental Health team will advise you on issues related to human health.

3.2 Groundwater Protection

Our [groundwater protection position statements](#) set out our position on groundwater protection for a wide range of activities and developments. These cover both planning and permitting.

We have defined Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used across the country for public drinking water supply. These zones are more vulnerable to contamination from activities that might cause pollution in the area. The closer the activity to groundwater, the greater the risk.

To see if your proposed development is located within a Source Protection Zone, please use our [online map](#).

We will **object** to the following developments within **SPZ1** in line with our groundwater protection position statements:

- large-scale above or below ground storage of hazardous substances (as may occur at a chemical works or at a petrol filling station)
- new development of non-landfill waste operations where the operation poses an intrinsic hazard to groundwater, for example deposit of waste for recovery activities.
- landspreading of sludge or liquid waste containing significant concentrations of pollutants.
- the locating of any new cemetery or the extension of any existing cemetery, within SPZ1, or 250 metres from a well, borehole or spring used to supply water that is used for human consumption, whichever is the greater distance.

3.3 Cemeteries

Development proposals for cemeteries should be avoided in areas where they present a high risk to the water environment. A [groundwater risk assessment](#) should be undertaken to accompany any planning application for a proposed burial site. This should show that there are minimal risks to the environment either at the time of burial, or in the future.

From 1 April 2022, cemeteries with the highest environmental risk are also controlled through the permitting system under the Environmental Permitting (England and Wales) Regulations 2016. If you need to apply for an environmental permit, you must also provide a risk assessment as part of your application.

More information and guidance can be found on the following GOV.UK pages:

[protecting groundwater from human burials](#)

['The Environment Agency's approach to groundwater protection](#) – specifically Section L: Cemetery developments

3.4 Surface Water Drainage

We recommend the use of Sustainable Drainage Systems (SuDS). These techniques can provide a method for reducing runoff that could otherwise lead to flooding. They can also minimise pollution impacts, improve biodiversity and provide amenity areas.

Where infiltration drainage is proposed, it must be demonstrated that it will not pose a risk to groundwater quality. Infiltration should not be focused in areas where ground contamination has been identified. Surface water infiltrating through contaminated ground can mobilise contaminants and result in pollution of the groundwater. Where necessary, we will seek to control the depths of soakaway systems by recommending maximum penetration depths and a requirement that the water table should not be intersected. In general, groups of shallow soakaways are preferable to one or two deep boreholes.

Where infiltration SuDS are to be used for surface run-off from roads, car parking and public or amenity areas, they should have a suitable series of treatment steps to prevent the pollution of

groundwater. For the immediate drainage catchment areas used for handling and storage of chemicals and fuel, handling and storage of waste and lorry, bus and coach parking or turning areas, infiltration SuDS are not permitted without an environmental permit.

Please note that we cannot issue an environmental permit for the direct discharge of hazardous substances into groundwater.

Further guidance can be found in our [groundwater protection position statements](#) and the updated [CIRIA SUDs manual](#).

Sustainable Drainage Systems (SuDS) should always be carefully considered in discussions with the Lead Local Flood Authority, who are responsible for providing advice on the management of surface water drainage. You should consult them for their comments on your proposal.

Section 4: Foul Water Drainage & Water Resources

4.1 Foul Water Drainage

Government guidance contained within the [NPPG](#) (Water supply, wastewater and water quality – considerations for planning applications, paragraph 020) sets out a hierarchy of drainage options that must be considered and discounted in the following order:

1. Connection to the public sewer
2. Package sewage treatment plant (adopted in due course by the sewerage company or owned and operated under a new appointment or variation)
3. Septic tank

The first presumption must be to provide a system of foul drainage discharging into a public sewer to be treated at a public sewage treatment works. Only where an applicant can demonstrate to the satisfaction of the LPA that connection to a public sewer is not feasible due to the cost and / or practicability should a non-mains foul sewage disposal solution be considered.

The NPPG states that ‘applications for developments relying on anything other than connection to a public sewage treatment plant should be supported by sufficient information to understand the potential implications for the water environment’. Any planning application which includes a non-mains system should therefore be accompanied by a [foul drainage assessment form](#) (FDA) which provides sufficient information for an assessment to be made of the risks of pollution to the water environment. For the proposal to be acceptable the FDA will need to demonstrate that the proposed system will be viable and will not be detrimental to the water environment.

Where the proposed development involves the connection of foul drainage to an existing non-mains drainage system, the applicant should ensure that it is in a good state of repair, regularly de-sludged and of sufficient capacity to deal with any potential increase in flow and loading which may occur as a result of the development. We have provided [guidance](#) to LPAs on non-mains drainage from non-major development to help them determine these planning applications.

Further information on septic tanks and treatment plants can be found [here](#).

4.2 Trade Effluent

Effluent discharged from any premises operating as a trade or industry, and effluent generated by a commercial enterprise where the effluent is different to that which would arise from domestic activities in a normal home, is described as trade effluent.

If you wish to discharge a trade effluent to groundwater or surface water via a non-mains system, you will require a permit under the Environmental Permitting Regulations.

If you wish to discharge a trade effluent to the public sewer, or a private sewer that connects to a public foul sewer, a trade effluent consent or a trade effluent agreement with your water and sewerage company must be obtained before you do so.

If you are not able to discharge effluent it will be classed as waste and you must then comply with your duty of care responsibilities.

4.3 Environmental Permitting Regulations (Foul Drainage and Trade Effluent)

Environmental Permitting Regulations require any discharge of sewage or trade effluent made to either surface water or groundwater to be registered as an exempt discharge activity or hold a permit issued by the Environment Agency, additional to planning permission. This applies to any discharge to inland freshwaters, coastal waters or relevant territorial waters.

The granting of planning permission does not guarantee the granting of an Environmental Permit. Upon receipt of a correctly filled in application form we will carry out an assessment. It can take up to 4 months before we are able to decide whether to grant a permit or not.

Where a pre-existing non-mains drainage system is covered by a permit to discharge then an application to vary the permit will need to be made to reflect the increase in volume being discharged. It can take up to 13 weeks before we decide whether to vary a permit.

4.4 Water Resources

All new homes are required to meet the mandatory national water efficiency standard for consumption as set out in the [Building Regulations](#) of 125 litres/person/day. In some water-stressed areas, LPAs have adopted policies in their Local Plans that require developers to apply the tighter Building Regulations optional requirement of 110 litres/person/day. While the use of the tighter consumption requirement is not required everywhere, we still recommend developers apply it where possible to ensure their schemes minimise their impact on the environment as much as possible by reducing demand for water.

We suggest you submit a [water efficiency calculator](#) report, or equivalent information, at the planning stage to demonstrate compliance with this standard. Achieving these targets can be done with existing technology by installing efficient showerheads, spray taps and low flush toilets. Complex greywater recycling and rainwater harvesting schemes are not typically required to adhere to this water efficiency standard.

We also recommend that new non-residential commercial buildings are required to achieve a BREEAM 'excellent' rating for water efficiency (or an equivalent rating with any successors).

Older buildings are often the least efficient in resource use. We strongly recommend the retrofitting of existing buildings where opportunities arise through refurbishments and changes of use. There

are a number of [BREEAM Technical Standards](#) documents to support retrofitting for commercial and residential buildings.

Section 5: Waste

5.1 Development Close to an Existing Permitted Sites

New development in close proximity to an existing waste facility could result in the community at the proposed development being exposed to odour, noise, dust and pest impacts. The severity of these impacts will depend on the size of the facility, the nature of the waste it takes and prevailing weather conditions. If the site operator can demonstrate that they have taken all reasonable precautions to mitigate these impacts, the facility and community may co-exist, with some residual impacts. In some cases, these residual impacts may cause local residents concern, and there are limits to the mitigation the operator can apply. Only in very exceptional circumstances would we revoke the operators permit.

Generally, sensitive development (e.g. occupied buildings) within 50m of such a facility is unacceptable because of the potential impacts to residents that may not be able to be mitigated. If any development is proposed within 50m of such a site at the planning application stage, we may object to the application on this basis.

5.2 Waste Management

The CL:AIRE Definition of Waste: Development Industry Code of Practice (version 2) provides operators with a framework for determining whether or not excavated material arising from site during remediation and/ or land development works are waste or have ceased to be waste. Under the Code of Practice:

- excavated materials that are recovered via a treatment operation can be re-used on-site providing they are treated to a standard such that they fit for purpose and unlikely to cause pollution
- treated materials can be transferred between sites as part of a hub and cluster project
- some naturally occurring clean material can be transferred directly between sites

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically, and that the permitting status of any proposed on-site operations are clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.

We recommend that developers should refer to:

- the position statement on the Definition of Waste: Development Industry Code of Practice
- The waste management page on GOV.UK

5.3 Waste To Be Taken Off-Site

Contaminated soil that is (or must be) disposed of is waste. Therefore, its handling, transport, treatment and disposal are subject to waste management legislation, which includes:

- Duty of Care Regulations 1991
- Hazardous Waste (England and Wales) Regulations 2005
- Environmental Permitting (England and Wales) Regulations 2016
- The Waste (England and Wales) Regulations 2011

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically in line with British Standard BS EN 14899:2005 'Characterization of Waste - Sampling of Waste Materials - Framework for the Preparation and Application of a Sampling Plan' and that the permitting status of any proposed treatment or disposal activity is clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.

If the total quantity of hazardous waste material produced or taken off-site is 500kg or greater in any 12 month period, the developer will need to register with us as a hazardous waste producer. Refer to the hazardous waste pages on gov.uk for more information.

5.4 Environmental Permitting Regulations (Waste)

To see if your proposed development requires an Environmental Permit under the Environmental Permitting Regulations please refer to gov.uk.

As planning and permitting decisions are often closely linked, we have issued [detailed guidance for developments requiring planning permission and environmental permits](#). This guidance explains how, when responding to planning consultations that require environmental permits, we will advise of three possible positions:

No major permitting concerns

More detailed consideration is required and parallel tracking is recommended

Don't proceed – unlikely to grant a permit

We advise joint discussions with the applicant, planning authority and ourselves, as well as parallel tracking of the planning and permit applications where possible. Parallel tracking planning and environmental permit applications offers the best option for ensuring that all issues can be identified and resolved, where possible, at the earliest possible stages. This will avoid the potential need for amendments to the planning application post-permission.

Section 6: Agricultural Development

6.1 Agricultural Buildings

If the buildings are to be used for livestock housing, the operator must ensure that they comply with the relevant regulations regarding the storage of slurry and silage. Any increase in the numbers of livestock may require the construction or expansion of slurry and silage storage facilities.

The operator should ensure that they comply with the requirements of The Water Resources (Control of Pollution) (Silage, Slurry and Agricultural Fuel Oil) (England) Regulations 2010, commonly known as the 'SSAFO regs', and the storage requirements of The Nitrate Pollution Prevention Regulations 2015, commonly known as the 'NVZ regs'.

6.2 Slurry Storage

If your livestock produces slurry, you must be able to store the slurry produced in accordance with the regulations on capacity, construction, and the associated calculations and records.

Depending on the relevant regulations, slurry stores must have the capacity to store:

4, 5 or 6 months of slurry;
rainfall expected to enter the store during the storage period including yards and roofs; and
any wash water or other liquids that enter the store during that period.

If you have poultry manure or other types of solid manure you must store them:

in a vessel;
on an impermeable base, with appropriate collection and containment of runoff;
in a roofed building; or
in an appropriately located temporary field heap.

If you build a new facility for storing organic manure (i.e. slurry stores or impermeable bases for solid manure) and/or if you substantially reconstruct or enlarge your existing facilities, you must:

comply with standards set down in the SSAFO Regulations, and
notify the Environment Agency in writing about your intention to build a new store, or
substantially enlarge or reconstruct an existing store at least 14 days before you start
construction or reconstruction works.

6.3 Silage Storage

All parts of a silo must be resistant to attack. Your silo must have:

an impermeable base extending beyond any walls
impermeable drainage collection channels around the outside, flowing into an appropriately
sized effluent tank

Further guidance is available at gov.uk.

Disclaimer

Please note that this document is a response to a pre-application enquiry only and does not represent our final view in relation to any future planning application made in relation to any site. We reserve the right to change our position in relation to any such application. This response is based on current planning policy, associated legislation, and environmental data/information. If any of these elements change in the future then we may need to reconsider our position.

As part of this preliminary response we have not technically reviewed any documents. You should seek your own expert advice in relation to technical matters relevant to any planning application before submission.

If you have any questions please contact the Devon, Cornwall & Isles of Scilly Sustainable Places team: SPDC@environment-agency.gov.uk



Appendix C Predicted Sea Level Rise

Tidal still water levels (mAOD)



| | |
|---------------|---|
| Project No. | 1597 |
| Project Title | Harbour Avenue, Camel's Head |
| Client | Nigel Polkinghorne Architectural Services |

| | |
|-------------|--------------|
| Calcs by | BF |
| Reviewed by | JB |
| Date | 05/ 01/ 2024 |

Worst Case Data Taken from ESTUARY_Saltash node (1005)

Data Source (applied to 2017 Baseline SWL):

GOV.UK - Flood Risk Assessments: Climate Change Allowance (Dec '19 U)

Table 1: sea level allowances by river basin district for each epoch in mm for each year (based on a 1981 to 2000 baseline)

| Area of England | Allowance | 2000 to 2035 (mm) | 2036 to 2065 (mm) | 2066 to 2095 (mm) | 2096 to 2125 (mm) | Cumulative rise 2000 to 2125 (metres) |
|-----------------|----------------|-------------------|-------------------|-------------------|-------------------|---------------------------------------|
| South west | Higher central | 5.8 (203) | 8.8 (264) | 11.7 (351) | 13.1 (393) | 1.21 |
| South west | Upper end | 7 (245) | 11.4 (342) | 16 (480) | 18.4 (552) | 1.62 |

| Year | 2000-2035 Annual Sea Level Rise (mm) | 1 In 200 Level (m) |
|------|--------------------------------------|--------------------|
| 2000 | 7 | 3.37 |
| 2001 | | 3.38 |
| 2002 | | 3.39 |
| 2003 | | 3.39 |
| 2004 | | 3.40 |
| 2005 | | 3.41 |
| 2006 | | 3.41 |
| 2007 | | 3.42 |
| 2008 | | 3.43 |
| 2009 | | 3.43 |
| 2010 | | 3.44 |
| 2011 | | 3.45 |
| 2012 | | 3.46 |
| 2013 | | 3.46 |
| 2014 | | 3.47 |
| 2015 | | 3.48 |
| 2016 | | 3.48 |
| 2017 | | 3.49 |
| 2018 | | 3.50 |
| 2019 | | 3.50 |
| 2020 | | 3.51 |
| 2021 | | 3.52 |
| 2022 | | 3.53 |
| 2023 | | 3.53 |
| 2024 | | 3.54 |
| 2025 | | 3.55 |
| 2026 | | 3.55 |
| 2027 | | 3.56 |
| 2028 | | 3.57 |
| 2029 | | 3.57 |
| 2030 | | 3.58 |
| 2031 | | 3.59 |
| 2032 | | 3.60 |
| 2033 | | 3.60 |
| 2034 | | 3.61 |
| 2035 | 3.62 | |

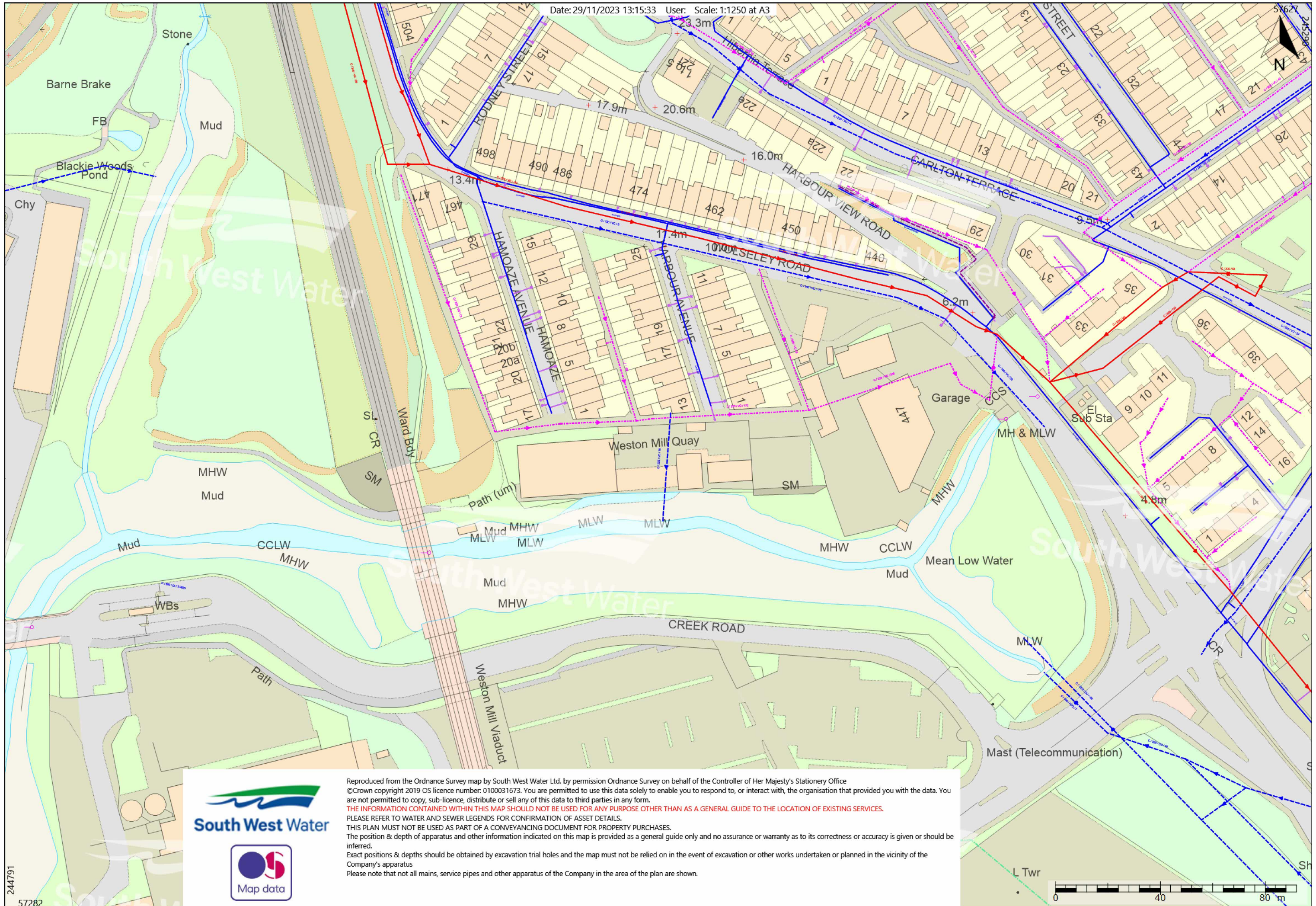
| Year | 2036-2065 Annual Sea Level Rise (mm) | 1 In 200 Level (m) |
|------|--------------------------------------|--------------------|
| 2036 | 11.4 | 3.63 |
| 2037 | | 3.64 |
| 2038 | | 3.65 |
| 2039 | | 3.66 |
| 2040 | | 3.67 |
| 2041 | | 3.68 |
| 2042 | | 3.70 |
| 2043 | | 3.71 |
| 2044 | | 3.72 |
| 2045 | | 3.73 |
| 2046 | | 3.74 |
| 2047 | | 3.75 |
| 2048 | | 3.76 |
| 2049 | | 3.78 |
| 2050 | | 3.79 |
| 2051 | | 3.80 |
| 2052 | | 3.81 |
| 2053 | | 3.82 |
| 2054 | | 3.83 |
| 2055 | | 3.84 |
| 2056 | | 3.86 |
| 2057 | | 3.87 |
| 2058 | | 3.88 |
| 2059 | | 3.89 |
| 2060 | | 3.90 |
| 2061 | | 3.91 |
| 2062 | | 3.92 |
| 2063 | | 3.94 |
| 2064 | | 3.95 |
| 2065 | | 3.96 |

| Year | 2066-2095 Annual Sea Level Rise (mm) | 1 In 200 Level (m) |
|------|--------------------------------------|--------------------|
| 2066 | 16.0 | 3.97 |
| 2067 | | 3.99 |
| 2068 | | 4.01 |
| 2069 | | 4.02 |
| 2070 | | 4.04 |
| 2071 | | 4.05 |
| 2072 | | 4.07 |
| 2073 | | 4.09 |
| 2074 | | 4.10 |
| 2075 | | 4.12 |
| 2076 | | 4.13 |
| 2077 | | 4.15 |
| 2078 | | 4.17 |
| 2079 | | 4.18 |
| 2080 | | 4.20 |
| 2081 | | 4.21 |
| 2082 | | 4.23 |
| 2083 | | 4.25 |
| 2084 | | 4.26 |
| 2085 | | 4.28 |
| 2086 | | 4.29 |
| 2087 | | 4.31 |
| 2088 | | 4.33 |
| 2089 | | 4.34 |
| 2090 | | 4.36 |
| 2091 | | 4.37 |
| 2092 | | 4.39 |
| 2093 | | 4.41 |
| 2094 | | 4.42 |
| 2095 | | 4.44 |

| Year | 2096-2125 Annual Sea Level Rise (mm) | 1 In 200 Level (m) |
|------|--------------------------------------|--------------------|
| 2096 | 18.4 | 4.46 |
| 2097 | | 4.47 |
| 2098 | | 4.49 |
| 2099 | | 4.51 |
| 2100 | | 4.53 |
| 2101 | | 4.55 |
| 2102 | | 4.57 |
| 2103 | | 4.59 |
| 2104 | | 4.60 |
| 2105 | | 4.62 |
| 2106 | | 4.64 |
| 2107 | | 4.66 |
| 2108 | | 4.68 |
| 2109 | | 4.70 |
| 2110 | | 4.71 |
| 2111 | | 4.73 |
| 2112 | | 4.75 |
| 2113 | | 4.77 |
| 2114 | | 4.79 |
| 2115 | | 4.81 |
| 2116 | | 4.82 |
| 2117 | | 4.84 |
| 2118 | | 4.86 |
| 2119 | | 4.88 |
| 2120 | | 4.90 |
| 2121 | | 4.92 |
| 2122 | | 4.93 |
| 2123 | | 4.95 |
| 2124 | | 4.97 |
| 2125 | | 4.99 |



Appendix D Existing drainage infrastructure

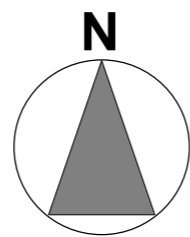
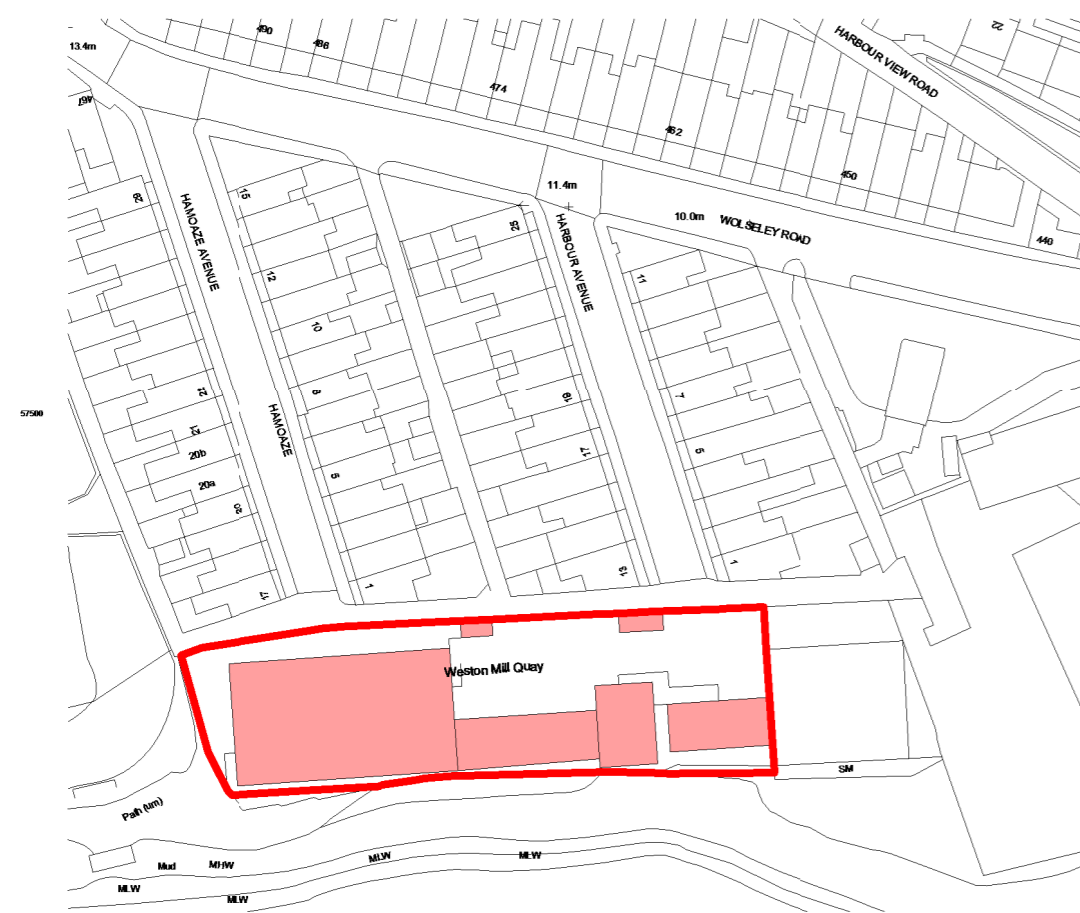


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 PLEASE REFER TO WATER AND SEWER LEGENDS FOR CONFIRMATION OF ASSET DETAILS.
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 Exact positions & depths should be obtained by excavation trial holes and the map must not be relied on in the event of excavation or other works undertaken or planned in the vicinity of the Company's apparatus.
 Please note that not all mains, service pipes and other apparatus of the Company in the area of the plan are shown.



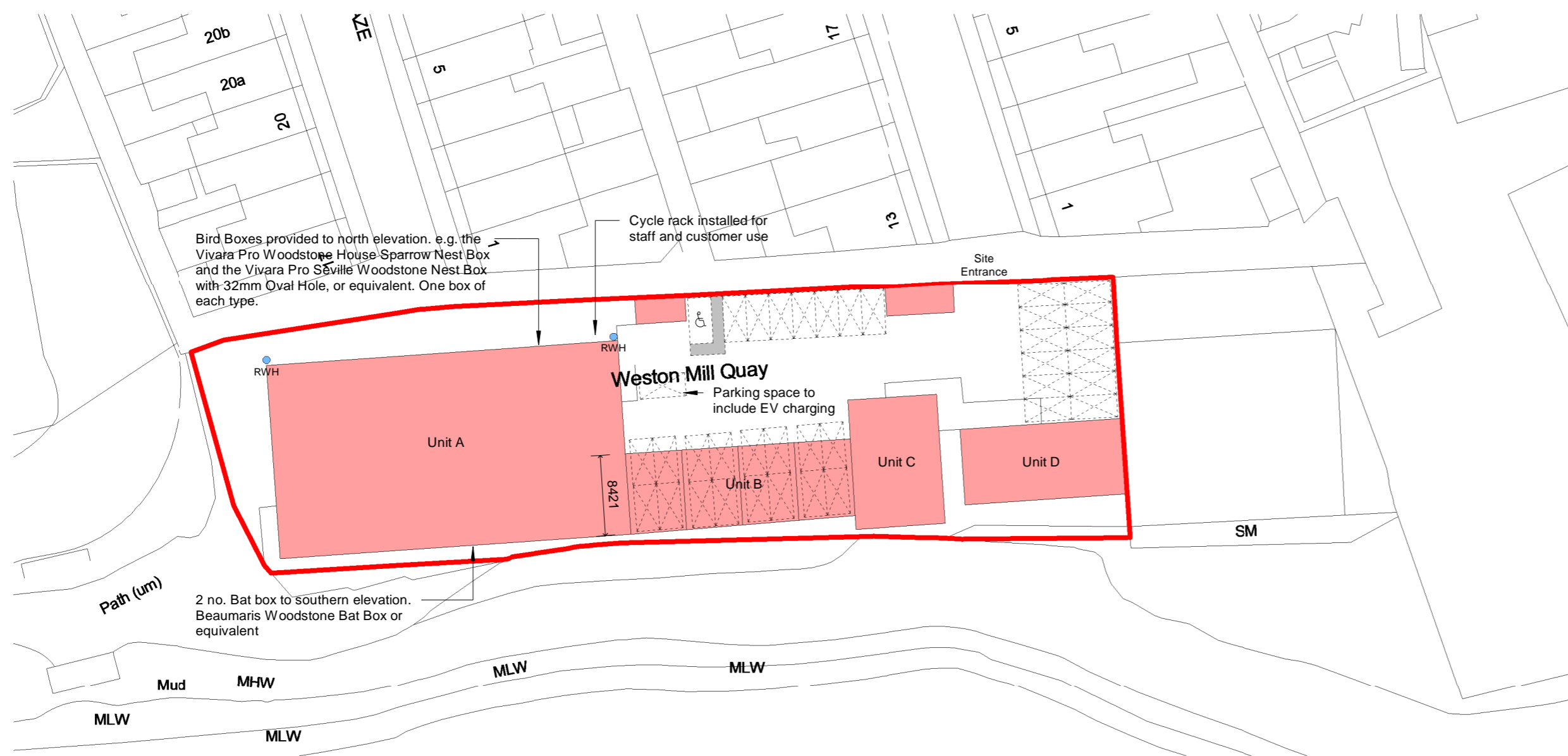
Appendix E Proposed Masterplan

| | | |
|--------|-----|-----|
| 1:50 | 0 | 1m |
| 1:100 | 1m | 1m |
| 1:200 | 2m | 1m |
| 1:250 | 2m | 1m |
| 1:500 | 5m | 10m |
| 1:1250 | 10m | |
| 1:2500 | 20m | |



Location Plan
 1 : 1250

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Block Plan
 1 : 500

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Revision: A -30.05.23 -Validation Updates



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Change of use from F1 to B8 Plus E

at
 Harbour Avenue
 Plymouth
 Devon
 PL5 1BH

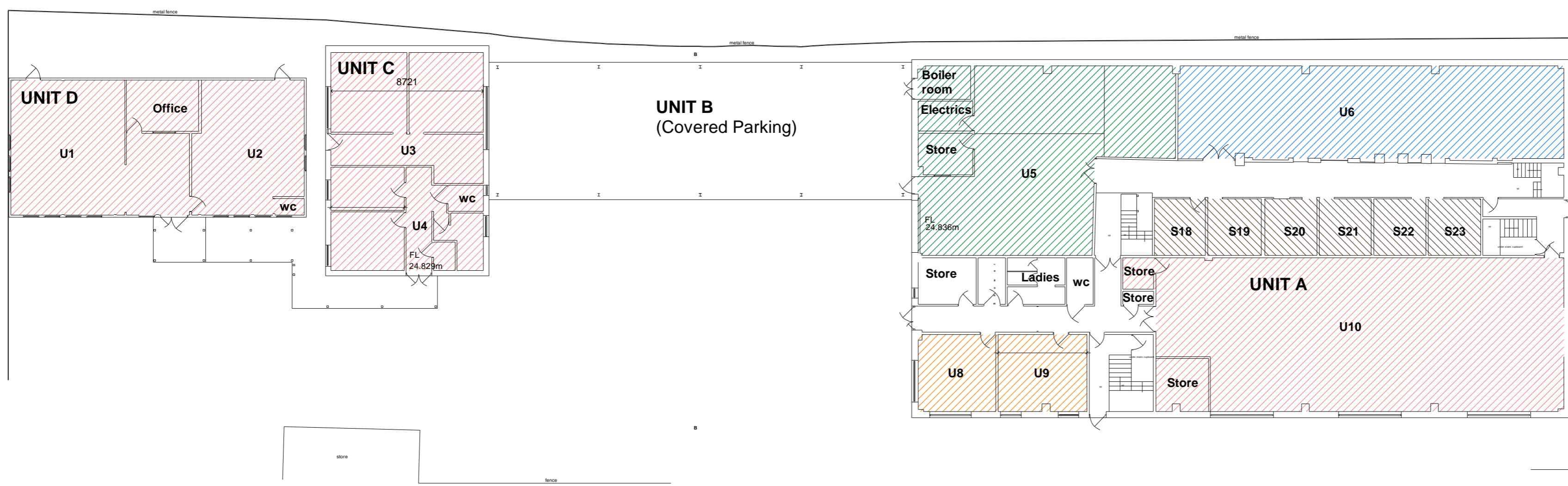
for
 Mr R Spriggs

Title
Location and Block Plans

Scale: As indicated A2 L sheet size.

Org No. 1274 01 rev: A

| | | |
|--------|---|-----|
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| 1:100 | 0 | 1m |
| 1:200 | 0 | 1m |
| 1:250 | 0 | 1m |
| 1:500 | 0 | 10m |
| 1:1250 | 0 | 10m |
| 1:2500 | 0 | 20m |



Ground Floor Plan

1 : 200

- U1 -Business storage, distribution and office
- U2 -Business storage, distribution and office
- U3 -Business storage, distribution and office
- U4 -Business storage, distribution and office
- U10 -Business storage, distribution and office
- U11 -Business storage, distribution and office
- U12 -Business storage, distribution and office

- U5 -Indoor vehicle storage

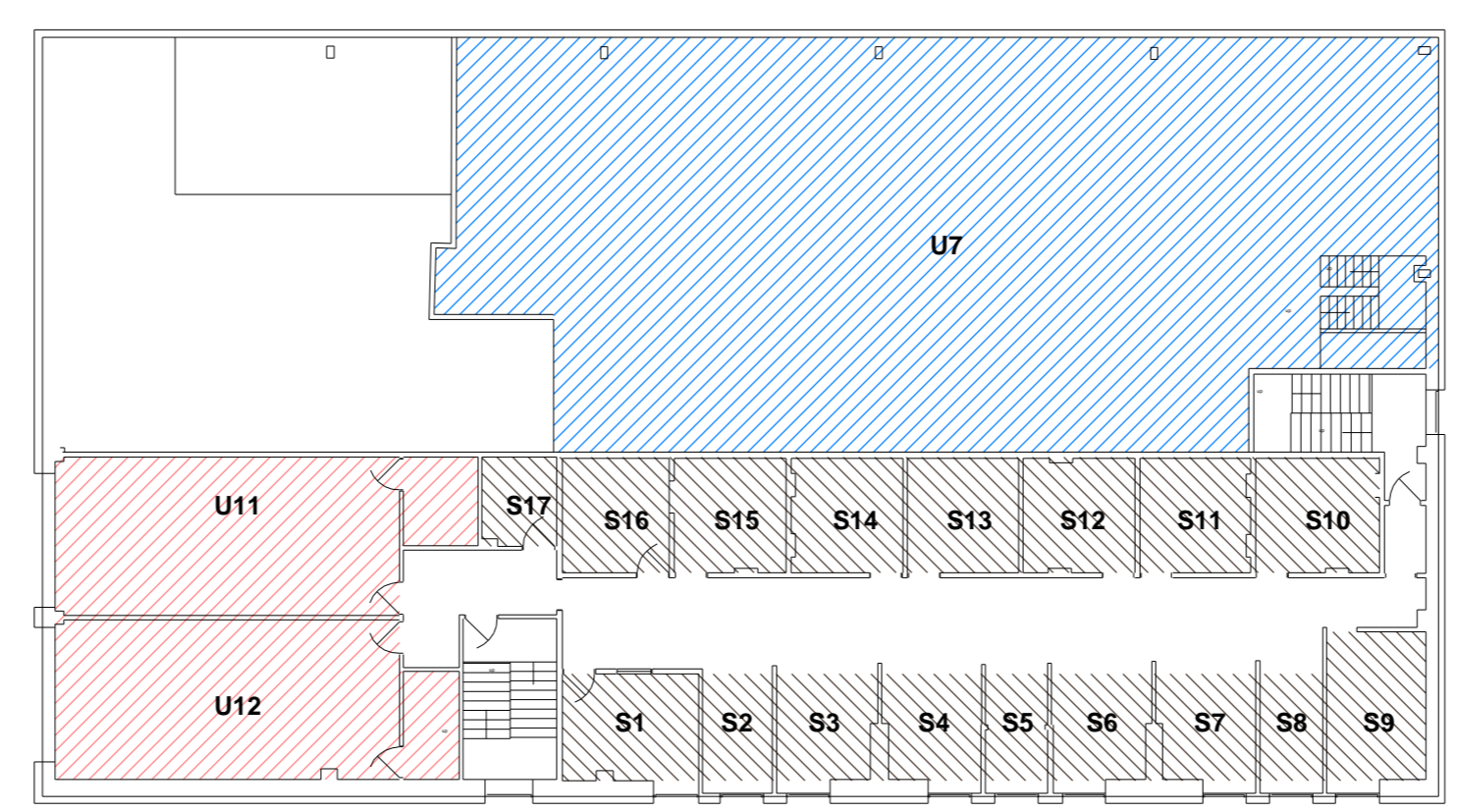
- U6 -Recreational sports
- U7 -Recreational sports

- U8 -Office and storage
- U9 -Office and storage

- S1 -S24 -Self Storage

Building Uses Key

1 : 20



First Floor Plan

1 : 200

Revision:



npas Devon Limited
 1 Enterprise Road
 Roundswell
 Barnstaple,
 Devon, EX31 3YB
 e: info@npasltd.co.uk
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Change of use from F1 to B8 Plus E

at
 Harbour Avenue
 Plymouth
 Devon
 PL5 1BH

for
 Mr R Spriggs

Title
Building Uses Plan

Scale, As indicated A2 L sheet size.

Org No. 1274 02 rev:



Appendix F Flood Warning Evacuation Plan

FLOOD WARNING AND EVACUATION PLAN

Harbour Avenue, Camel's Head



Document Control

This plan has been prepared by Awcock Ward Partnership Consulting Ltd (AWP) to inform employees on the joint responsibilities of the employer and the employees to prepare for and respond promptly to flood warnings.

A copy of this plan will be made available to all employees:

- On induction; and
- In response to lessons learnt.

Plan Produced by: Ben Fenton, Graduate Engineer
Checked by: James Blyth, Senior Engineer
Approved by: Chris Yalden, Technical Director

Version Control

| Version No: | Comment | Checked by: | Approved by: | Date: |
|-------------|------------------|-------------|--------------|------------|
| Draft | Draft (Planning) | JB | CY | 12.01.2024 |
| | | | | |
| | | | | |
| | | | | |

Disclaimer

This Flood Warning & Evacuation Plan (FWEP) has been produced with reference to Appendix L - 'LLFA Flood Emergency Plan Guidance' of the Plymouth City Council Document 'Local Flood Risk Management Strategy Part 2 - A Technical Design Guide' (August 2023), as well as the 'Personal Flood Plan' template produced by the Environment Agency.

This Flood Warning & Evacuation Plan (FWEP) template is suitable for the purposes set out within the National Planning Policy Framework. This plan is however the sole responsibility of the signatories and/or their representatives.

Plymouth City Council cannot accept responsibility for any omission or error contained in any such plan, or for loss, damage, or inconvenience, which may result from the plans' implementation. Any subsequent approval does not impute any approval of the plans from the Environment Agency or any of the emergency services

1. Introduction

This Flood Warning & Evacuation Plan (FWEP) has been produced by AWP in respect of the proposed redevelopment of land at Harbour Avenue, Camel's Head, Plymouth. The site operators own the FWEP, are responsible for its implementation, dissemination, and annual review.

The FWEP captures a summary of the site's flood risk, taking into account flood mitigation measures incorporated in the design of the site and properties, and provides all relevant information, contact details and procedures to prepare for, respond to and recover from a flood event.

A Flood Warning and Evacuation Plan does not remove the risk of flooding from a site. The objective of a Flood Warning and Evacuation Plan is to provide a means by which those working/visiting the development shall be made aware of the flood hazard, and to identify any procedures that will enable them to avoid being directly exposed to the hazard in any future flood events that may affect the site.

Preparedness for future floods can help reduce the impact on people and property.

AWP have given due regard to the safety of employees, responding organisations, available best practice, relevant legislation, advice provided by the emergency services, and the Plymouth City Council Local Flood Risk Management Strategy.

2. Objectives

In the production of this FWEP, AWP have identified the following key objectives:

- To sign up to [Flood Warnings Direct](#) and [Weather Warnings](#);
- To provide for and signpost clear evacuation routes for employees;
- To ensure adequate ingress and egress for the emergency services; and
- Reduce the risk to life and damage to property.

3. Flood Risk

Flood risk is described in detail within the Flood Risk Assessment (prepared by AWP) which was submitted as a standalone document in support of the planning application for this site.

4. Flood Warnings

The Environment Agency Flood Warning system will contact the general or district manager that has responsibility over the management of the premises, or on a designated number for an out of hours event. *(to be advised prior to occupation)*

Should the designated contact be unavailable, a secondary contact will be contacted. *(to be advised prior to occupation)*

The premises commit to signing up to the Environment Agency Flood Warning Scheme <https://www.fws.environment-agency.gov.uk/app/olr/register> *(upon planning consent, prior to occupation)*

Environment Agency Floodline Telephone No. 0345 988 1188.

The action to be taken for each flood warning is presented within **Table 1** at the back of this plan.

The location of supply cut-offs and chemical/dangerous substances are provided within **Appendix A**. *(to be completed upon planning consent, prior to occupation)*

Evacuation

The decision to evacuate or take shelter ultimately rests with the employer/employee, but must be made to allow sufficient time to conduct the evacuation before flooding occurs. Flood waters contain hidden dangers and will impede, if not prevent, a safe evacuation.

The council's preference is always (in circumstances where a Flood Warning and Evacuation Plan would be required) to evacuate occupants before a flood event occurs, not during an event. Safe refuge (staying within the building - above the design flood event levels) should only be considered where dry access and egress from the building to an area/community building not at risk of flooding cannot be achieved.

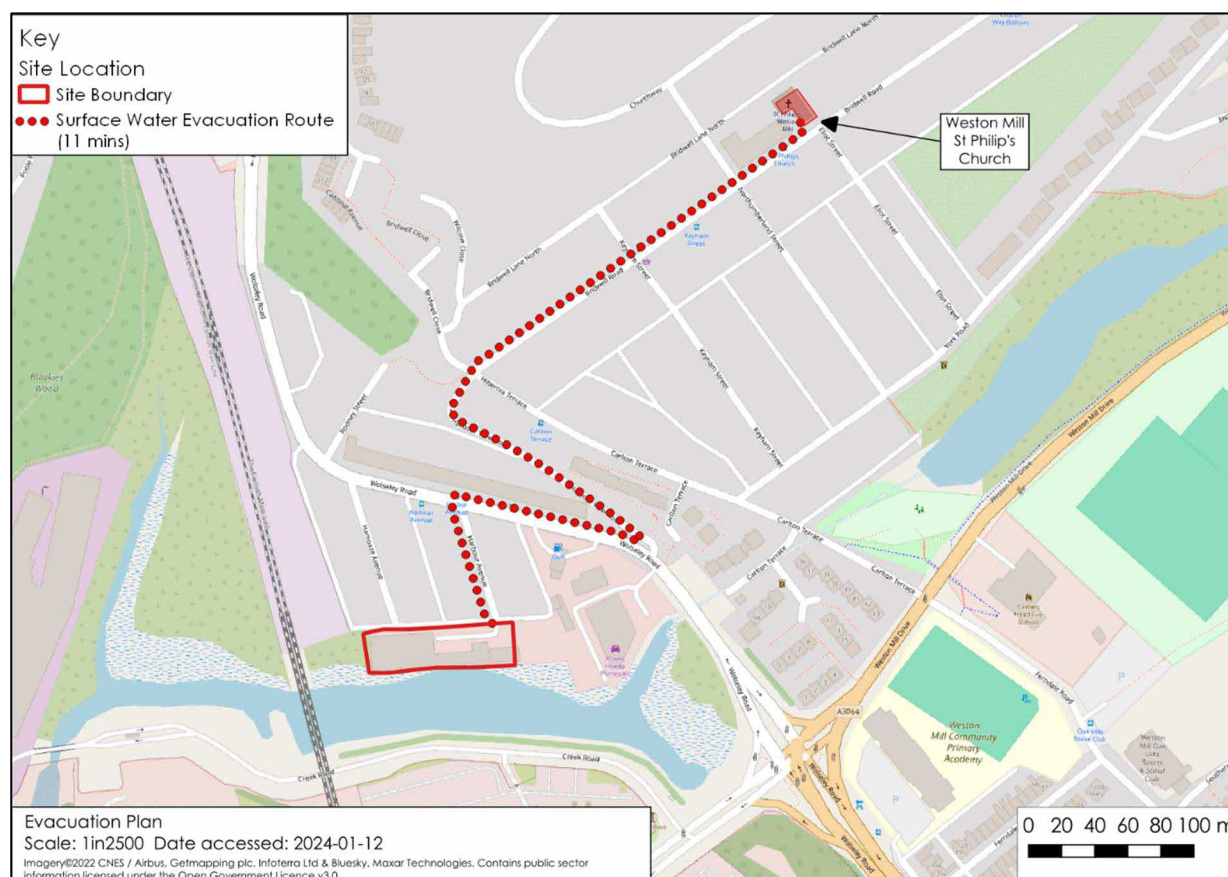
Evacuation during a flood event should only occur in exceptional circumstances where a Flood Warning has not reached either the occupants or relevant management responsible for triggering the Flood Warning and Evacuation Plan; and it is deemed safe to do so by the Emergency Services. It should not be left to the discretion of the occupants as to whether it is safe to evacuate during a flood event. The preference in this exceptional circumstance would be for the occupants to remain indoors and seek safe refuge on the first floor of the building, and to call the emergency services.

In the event of an evacuation, all persons within the building or respective grounds should be made to follow the designated evacuation route.

An assessment of the type of flooding event should be made based on the flood code received, and the evacuation route should be conducted as follows:

- A. In a Surface Water Flooding Event;** the evacuation route leads people out of the site and north along Harbour Avenue. At the junction with Wolseley Road the route turns right and continues for a short distance before turning left into Harbour View Road and then continuing straight on to Bridwell Road. Flooding on Bridwell Street is very limited and would remain passable in vehicle or on foot. If conditions do not allow for wider evacuation, then St Philp's Church might offer safe refuge until conditions improve. It is located approximately 200m along Bridwell Road and remains outside the extents of any surface water flooding.
- B. In a Tidal Flooding Event;** the same above evacuation route can be followed. Beyond the site, the lowest point on this evacuation route would be the junction of Wolseley Road and Harbour View Road, but this remains well above the future maximum predicted sea level.
- C. If neither route is safe to evacuate;** the occupants should seek safe refuge on the first floor of the western commercial unit and call the emergency services.

The evacuation route is inset below with a copy included within **Appendix B**:



You are advised not to assume that the emergency services will be able to assist you with the evacuation; their focus will be directed to those in greatest need.

Where evacuation is not a feasible option, or has been delayed, you should move to the first floor of the western commercial unit; taking with you any important documents, and readily water or drinks, food supplies and medicines (see UK Gov. web page '[Preparing for emergencies](#)').

It is recommended that the building operator provides a Flood Kit/Grab Bag on site. The contents of this should remain in line with the National Flood Forum Emergency Flood Kit.

Stand-down - Following confirmation from the Environment Agency, the decision can be taken to stand down. In this eventuality, the building should return to normal business following the agreed reoccupation procedure.

In case of injury, contact Emergency Services (999).

This Flood Warning and Evacuation Plan will be overridden by any advice given by competent authorised staff including the Emergency Services or Local Authority responders on the ground in the event of a serious flood event.

The response to a major flood event will involve a number of organisations working together at a local level, including the emergency services, local authority (the council), the Environment Agency and utility companies. The Devon, Cornwall and Isles of Scilly LRF have produced the Multi Agency Flood Plan to provide relevant information and outline the response arrangements in place for a coordinated multi agency response:

<https://www.dcisprepared.org.uk/media/2158/multi-agency-flood-framework-lrfdcios-20160615-v24.pdf>.

Other key contact details are tabled below:

| Organisation | Telephone (office hours) | Telephone (out of hours) |
|----------------------------|--------------------------------|--------------------------------|
| Site Management | TBC | TBC |
| Floodline (EA) | 0345 988 1188 | 0345 988 1188 |
| Environment Agency | 0370 850 6506 | Use Floodline (above) |
| Plymouth City Council | 01752 668000 | 01752 668000 |
| Devon County Council | 0345 155 1015 | N/A |
| Emergency Services | 999 | 999 |
| Non-Emergency Police | 101 | 101 |
| Non-Emergency Fire | 01392 872200 | 01392 872200 |
| NHS Direct (non-emergency) | 111 | 111 |
| South West Water | 0844 346 2020 | 0844 346 2020 |
| Electricity Supplier | <i>TBC prior to occupation</i> | <i>TBC prior to occupation</i> |
| Gas Supplier | <i>TBC prior to occupation</i> | <i>TBC prior to occupation</i> |
| Telecoms Supplier | <i>TBC prior to occupation</i> | <i>TBC prior to occupation</i> |
| Insurance Company | <i>TBC prior to occupation</i> | <i>TBC prior to occupation</i> |
| Local Travel News | <i>TBC prior to occupation</i> | <i>TBC prior to occupation</i> |

7. Monitoring and review of the Plan




It is important that the Flood Warning and Evacuation Plan is kept up-to-date and accurate. It is the responsibility of the Plan owner to maintain and update the Plan at least every three years, when new information becomes available or a change in circumstances that may affect it occurs.

Details of the staff member(s) responsible for monitoring and reviewing, and updating or amending the plan, are set out within the below table.

| Role | Contact Name | Contact Number |
|-----------------------------------|--------------------------------|--------------------------------|
| Monitoring and reviewing the Plan | <i>TBC prior to occupation</i> | <i>TBC prior to occupation</i> |
| Updating & amending the Plan | <i>TBC prior to occupation</i> | <i>TBC prior to occupation</i> |

Annex A –Roles and Responsibilities

Table 1 –Flood Warning Activation Procedures

| Warnings | EA Recommended Actions | Actions | |
|---|---|---|---|
| | | Actions | Resources |
|  <p>What it means: Flooding is possible. Be prepared.</p> <p>When it's used: Two hours to two days in advance of flooding.</p> | <p>Be prepared to act on your FWEPP.</p> <p>Prepare a flood kit of essential items.</p> <p>Monitor local water levels and the flood forecast on our website.</p> | <p>Notify the designated contact, or secondary contact as appropriate.</p> <p>Advise all staff, visitors and lone workers that a flood alert has been received and that evacuation may need to be implemented if the code updates to a Flood Warning.</p> <p>Ensure that any records of scheduled appointments or visitors is kept close to hand and be prepared to cancel appointments or visits if the need arises.</p> <p>Retrieve the Flood Kit and keep to hand.</p> <p>Contact Floodline or the EA to keep informed on current situation.</p> | <p>Flood Kit (to include copy of the flood plan, first aid kit, torch and batteries, blanket, waterproofs, rubber gloves and contact list).</p> |
|  <p>What it means: Flooding is expected. Immediate action required.</p> <p>When it's used: Half an hour to one day in advance of flooding.</p> | <p>Move people, property, and valuables to a safe place.</p> <p>Turn off gas, electricity, and water supplies if safe to do so.</p> <p>Put flood protection equipment in place.</p> | <p>If the Flood Warning is received during operational hours or a flood is expected during opening hours, immediately close on-site businesses, transfer all sensitive property, files and equipment to a safe place and implement full evacuation of the building.</p> <p>Secure any flood protection equipment in place.</p> <p>Ensure all persons have been safely evacuated prior to securing the building. Ensure that services are switched off where safe to do so.</p> <p>Following evacuation, continue to halt on-site business until the building is declared safe for reuse and commencement of services.</p> | <p>Flood Kit (to include copy of the flood plan, first aid kit, torch and batteries, blanket, waterproofs, rubber gloves and contact list).</p> <p>Copy of the evacuation plan (Appendix B)</p> |
|  <p>What it means: Severe flooding. Danger to life.</p> <p>When it's used: When flooding poses a significant threat to life.</p> | <p>Stay in a safe place with a means of escape.</p> <p>Be ready should you need to evacuate from your building.</p> <p>Co-operate with the emergency services. Call 999 if you are in immediate danger.</p> | <p>Notify all persons present that a severe flood is imminent and advise that safe refuge should be taken within the building.</p> <p>Retrieve the Flood Kit and keep to hand.</p> <p>Contact the Emergency Services and communicate your conditions to assess whether emergency evacuation is necessary, or whether safe refuge remains the best course of action.</p> <p>Cancel all scheduled appointments or visitors for the day –continue to cancel future visits until the building is declared safe.</p> | <p>Flood Kit (to include copy of the flood plan, first aid kit, torch and batteries, blanket, waterproofs, rubber gloves and contact list).</p> |

| | | | | |
|--|--|--|---|--|
| <p>EA Flood Warnings</p> <p>No longer in force</p> | <p>What it means:</p> <p>No further flooding is currently expected in your area.</p> <p>When it's used:</p> <p>When river or sea conditions begin to return to normal.</p> | <p>Be careful. Flood water may still be around for several days.</p> <p>If you've been flooded, ring your insurance company as soon as possible.</p> | <p>Contact the Local Authority, Emergency Services, and utility companies to establish whether it is safe to access the building for inspection.</p> <p>Contact the insurance company as they may want to evaluate any impacts or damage resulting from the flood.</p> <p>Once the building is declared safe for access, work with the insurance company to ensure that works are progressed to remediate and declare safe the entrance ways.</p> <p>Isolate and remediate the internal building space prior to resuming on-site business to full capacity.</p> | |
| <p>Meteorological Office</p> <p>Weather Warnings</p> | <p>Warnings of heavy rainfall.</p> <p>Warnings of severe winter weather e.g. hail, snow, freezing rain.</p> | <p>Consider the impact of this type of weather –e.g. this could lead to surface water flooding, ground water flooding, increased river and sea levels.</p> | <p>Contact Floodline or the EA to keep informed on current situation. If there is a risk of flooding within opening hours, implement Flood Warning Actions (above).</p> <p>Monitor access and egress from the site. If all routes are at risk of flooding, cancel all on-site appointments and visits for the remainder of the day and notify all persons that they must take safe refuge within the building until such time as flood waters have receded.</p> <p>Liaise with emergency services to assess whether assisted evacuation is necessary.</p> | |

9. Additional Guidance

General advice

- Business Flood Plan advice - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/410606/LIT_5284.pdf
- Find out if your property is at risk of flooding - <http://www.environmentagency.gov.uk/homeandleisure/floods/31650.aspx>
- Sign up to receive flood warnings - <https://www.gov.uk/sign-up-for-flood-warnings>
- Monitoring flood warnings and river levels - <https://www.gov.uk/check-if-youre-at-risk-offlooding>
- Make a personal flood plan - <https://www.gov.uk/prepare-for-a-flood/make-a-flood-plan>
- Preparing your property for flooding - <https://www.gov.uk/government/publications/prepareyour-property-for-flooding>
- What to do before, during and after a flood - <https://www.gov.uk/government/publications/flooding-what-to-do-before-during-and-after-a-flood>
- Using sandbags to reduce flooding - <https://www.gov.uk/government/publications/sandbagshow-to-use-them-to-prepare-for-a-flood>
- Advice on obtaining home insurance - <https://www.gov.uk/prepare-for-a-flood/get-insurance>

Improving the resistance and resilience of your property

- Improving your property's flood protection <https://www.gov.uk/prepare-for-a-flood/improveyour-property-flood-protection>
- Blue Pages - directory of businesses providing flood resistance and resilience products - <http://www.bluepages.org.uk/>

Business/commercial premises specific advice

- Prepare your business for flooding - <https://www.gov.uk/government/publications/preparingyour-business-for-flooding>

Emergency Planning Advice

- Direct Government Preparing for Emergencies - <https://www.gov.uk/government/policies/reducing-the-threats-of-flooding-and-coastalchange/supporting-pages/planning-for-and-dealing-with-flood-emergencies>

Appendix A. Key Locations and Protective Actions

| Service Cut-Off | | Description of Location | |
|---|-------------------|-------------------------|-----------------------------|
| Electricity | | | |
| Gas | | | |
| Water | | | |
| | | Description of Location | How to protect from a flood |
| First Aid Kit & Grab Bag | | | |
| Oil based products (fuel, oil) | | | |
| Chemicals (including cleansing) | | | |
| Medication | | | |
| Valuable Item | Protective Action | New Location | |
| <i>Identify stock, equipment and possessions that may need special protective measures, and describe the actions you will take to prevent damage in the event of a flood. We have suggested items and ways to protect them, but make sure you follow through on your plans.</i> | | | |
| | | | |
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