



Flood Consequence Assessment

Prepared for:
Mullai Group

November 2018

Our reference:
88440-Weaver-JulianTerrace

Location:
Site Adjacent to Julian Terrace
Port Talbot
SA12 6UE



Document Issue Record

Project: Flood Consequence Assessment
Client: Mullai Group
Location: Site Adjacent to Julian Terrace, Port Talbot SA12 6UE
Application: Construction of a commercial unit with a single flat above
Our reference: 88440-Weaver-JulianTerrace
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Key Facts

Flood Risk Posed:

- Flood Zone C1 as defined by Natural Resource Wales (NRW).
- Fluvial / Tidal risk originating from the River Avan / Afan.
- The site is shown to be entirely outside of the present day defended 1:100 year modelled flood extent, and will therefore remain dry during the modelled 1:100 year scenario at the present day.
- The depth of flooding on site for the defended 1:100 year event with allowance for climate change is 600mm, with a velocity of 0.15m/s. This is below the tolerable allowances in TAN15.
- Risk of groundwater and sewer surcharge flooding would appear to be low.
- The Natural Resources Wales Surface Water Flood Map suggests that the site lies within an area of "Medium" and "Low" risk of flooding from surface water.

Flood Risk Management:

- Flood depths do not exceed 600mm at the site or along the escape route, and safe escape as per the requirements of TAN15 can be provided.
- Flood proofing of the building will be incorporated as appropriate.
- A flood warning and evacuation plan will be implemented post development.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

Introduction

Unda Consulting Limited have been appointed Mullai Group (hereinafter referred to as “the applicant”) to undertake a Site Specific Flood Consequence Assessment (FCA) for Planning at Site Adjacent to Julian Terrace, Port Talbot SA12 6UE. (hereinafter referred to as “the site”). The FCA has been undertaken in accordance with Technical Advice Note 15 (TAN 15) and the associated technical guidance.

The site appears to be located within Flood Zone C1 as defined by Natural Resource Wales (NRW) on their Development Advice Map. Under Technical Advice Note 15 (TAN 15), a FCA is required if a proposed development:

- includes building or engineering works in Flood Zone C1 or C2;
- includes building or engineering works on land classified as having critical drainage problem;
- changes the use of land or buildings in a location at risk of flooding from rivers or the sea, or with critical drainage problems;
- changes the use of land or buildings in a way that increases the flood vulnerability of the development where it may be subject to other sources of flooding;
- is in Flood Zone B, but larger than 1 hectare.

Given that the proposed application site is located in Flood Zone C1 (Risk of flooding from rivers or the sea, served by significant flood defence infrastructure, including flood defences), and includes building works, the applicant is required to submit a FCA under TAN 15. The assessment should demonstrate to the Local Planning Authority (LPA) and NRW 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 potential users.

The objectives of a FCA to support a planning application are to establish:

- whether the proposed development is likely to be affected by current or future flooding from any source;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate.

Existing Situation

Site Usage:

The existing site is an empty plot, which is understood to be used for car parking.



Figure 1: Aerial view of the site and immediate surrounding area (Source: Google Earth)

Topography:

Environment Agency LiDAR has been used to assess the topography across the site and wider area. Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground surface. Up to 100,000 measurements per second are made of the ground, allowing highly detailed terrain models to be generated at high spatial resolutions. The EA's LiDAR data archive contains digital elevation data derived from surveys carried out by the EA's specialist remote sensing team. Accurate elevation data is available for over 70% of England. The LiDAR technique records an elevation accurate to +0.3m every 2m. This dataset is derived from a combination of our full dataset which has been merged and re-sampled to give the best possible coverage. The dataset can be supplied as a Digital Surface Model (DSM) produced from the signal returned to the LIDAR (which includes heights of objects, such as vehicles, buildings and vegetation, as well as the terrain surface) or as a Digital Terrain Model (DTM) produced by removing objects from the Digital Surface Model. 2.0m horizontal resolution DTM LiDAR data has been used for the purposes of this study.

2m horizontal resolution LiDAR topographic data shows topographic levels on site to range between approximately 4.90mAOD and 5.20mAOD.

Proposed Development

The proposed planning application is for the Construction of a commercial unit with a single flat above.

At the time of writing no proposed development plans were available.



Figure 2: Street view of the site (Source: Google Earth)

Assessment of Flood Risk

Flood Zones:

Within planning, Flood Zones refer to the probability of river and sea flooding. They are shown on the Natural Resource Wales Development Advice Map, available on Natural Resource Wales' web site.

Description of Zone	Zone Name	Use within the precautionary framework
Considered to be at little or no risk of fluvial or tidal/coastal flooding.	A	Used to indicate that justification test is not applicable and no need to consider flood risk further.
Areas known to have been flooded in the past evidenced by sedimentary deposits.	B	Used as part of a precautionary approach to indicate where site levels should be checked against the extreme (0.1%) flood level. If site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further.
Based on Environment Agency extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal)	C	Used to indicate that flooding issues should be considered as an integral part of decision making by the application of the justification test including assessment of consequences.
Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.	C1	Used to indicate that development can take place subject to application of justification test, including acceptability of consequences
Areas of the floodplain without significant flood defence infrastructure.	C2	Used to indicate that only less vulnerable development should be considered subject to application of justification test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.

Table 1: Flood Zones

The Flood Zones shown on the Natural Resource Wales Development Advice Map do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.

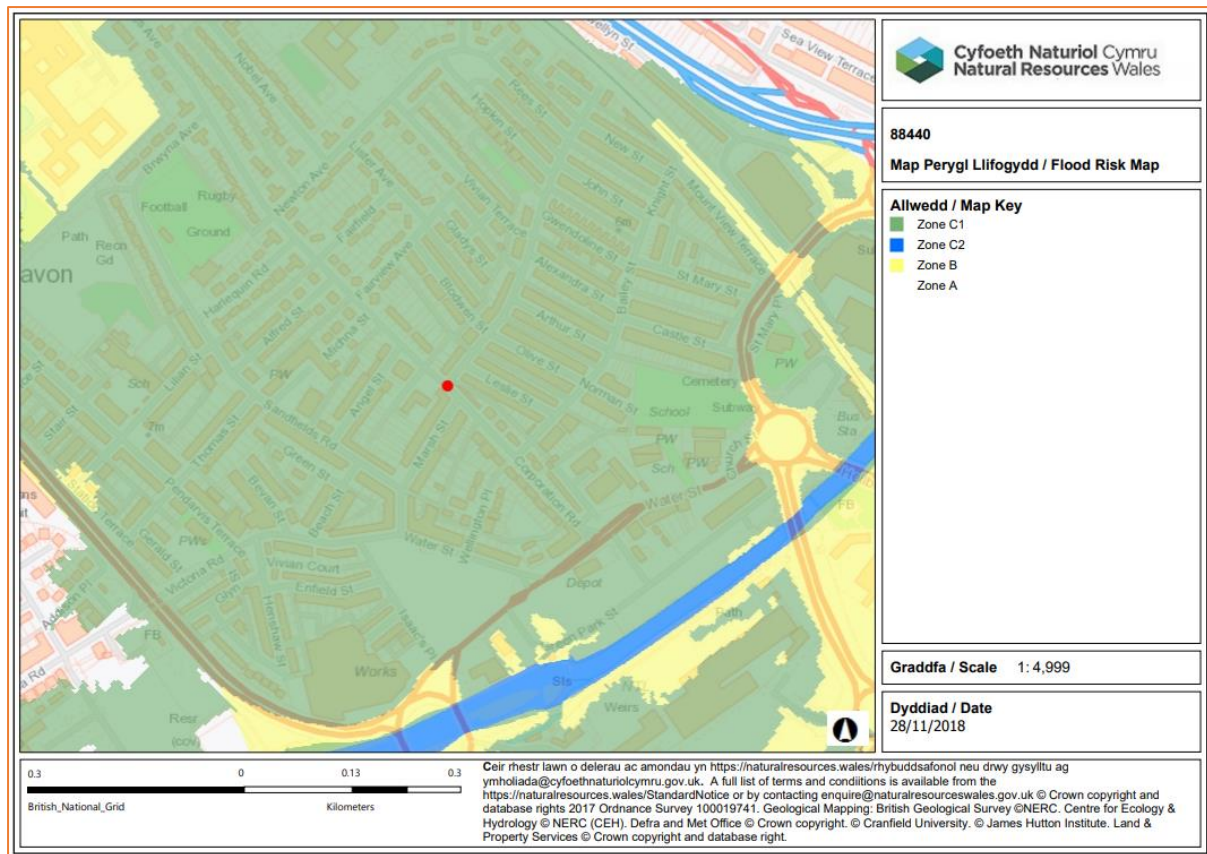


Figure 3: Natural Resource Wales Development Advice Map (Source: NRW)

The site is located within Flood Zone C1 (Risk of flooding from rivers or the sea, served by significant flood defence infrastructure, including flood defences), which means it is defined as land having at least a 1 in 1000 annual probability of fluvial / tidal flooding.

The risk would appear to originate from the River Afon / Afan approximately 360m to the southeast of the site.

Fluvial / Tidal (River Afon / Afan):

The Afon Afan is approximately 22km long with a catchment of 91km²; it flows from the village of Cymmer where it is formed by the converging rivers Corrwg and Gwynfi. The river catchment is a steep gradient catchment, with boulders and bedrock being the predominant substrate of the watercourse. It experiences rapid fluctuations in flow depending on the level of local rainfall resulting in a flow regime where water levels rise and fall quickly. It follows a generally south westerly course through the steep and forested narrow Afan valley before turning in a southerly direction toward Port Talbot. The river flows under the M4 and A48 in a formal, man-made channel before discharging into the Bristol Channel just beyond the Port Talbot Docks entrance.

The river is tidal as far upstream as Velindre, but a weir exists approximately half a mile downstream at Green Park which aims to prevent tidal inundation via the river in Port Talbot.

During times of higher than normal tides, such as the Mean High Water Spring tide (MHWS) the weir is overtopped and the tide reaches Velindre, this can cause problems if these tides coincide with high fluvial flows within the river (Source: Neath Port Talbot SFCA).

Modelled flood levels and extents:

Modelled flood levels and flood extents have been received from the NRW as part of a flood data request (NRW ref: ATI-16243a). The results summarised below are taken from 1D/2D Estry TUFLOW model for Port Talbot. The 1 in 100, 1 in 100 + climate change and 1 in 1000 in defended and un-defended scenarios have been provided.

Return Period	Defended	Undefended
1:100 year	Outside	2.0+m depth and 0.45m/s velocity
1:100 year plus climate change	0.6m depth and 0.15m/s velocity	2.0+m depth and 0.45m/s velocity
1:1000 year	1.0m depth and 0.3m/s velocity	2.0+m depth and 2.0+m/s velocity

The site is shown to be entirely outside of the present day defended 1:100 year modelled flood extent, and will therefore remain dry during the modelled 1:100 year scenario at the present day.

The site is currently protected by flood defences but in the event that these were breached or overtopped the site would be susceptible to flooding, for return periods in excess of the present day 1:100 year event.

For the defended 1:100 year event with allowance for climate change the site could be inundated with up to 0.6m of floodwater. For the undefended 1:100 year event with an allowance for climate change the site could be inundated with over 2.0m of floodwater. For the 1:1000 year event the site could be inundated with up to 1m of floodwater for the defended scenario, and over 2.0m for the undefended scenario.

Flood defences:

The DAM for the location, shows this site to be within Zone C1, so it is currently protected by flood defences but in the event that these were breached or overtopped the site may be susceptible to flooding.

The Neath Port Talbot SFCA states that Port Talbot is defended along both banks of the River Afan from Velindre through the town centre to Water Street.

The River Afan flood defences in the vicinity of the site comprise of a flood defence wall, built in 1987, with a condition of 3 – Fair. The design standard of protection offered by these defences is 1:100 year (Source: NRW).

Historical flood records:

According to NRW they hold no historic flooding information for the site.

Pluvial (Surface Water):

Pluvial (surface water) flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

In 2013 the EA and NRW, working with Lead Local Flood Authorities (LLFAs), produced an updated Flood Map for Surface Water. It is considered to represent a significant improvement on the previous surface water flood maps available, both in terms of method and representation of the risk of flooding. The modelling techniques and data used are considerably improved, and also incorporated locally produced mapping where this is available to represent features best modelled at a local scale.

The Flood Map for Surface Water assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual probability of flooding is shown in brackets):

- 1:30 (3.3%)
- 1:100 (1%)

- 1:1000 (0.1%)

The mapping below shows the Risk of Flooding from Surface Water centred on the site. Please note that NRW do not consider this information suitable to be used to identify the risk to individual properties or sites. It is useful to raise awareness in areas which may be at risk and may require additional investigation.

The Natural Resources Wales Surface Water Flood Map suggests that the site lies within an area of “Medium” and “Low” risk of flooding from surface water.



Figure 4: Extract from Natural Resources Wales Surface Water Flood Map (Source: NRW)

Groundwater:

Groundwater flooding occurs as a result of water rising up from the underlying rocks or from water flowing from abnormal springs. This tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). These may be extensive, regional aquifers, such as chalk or sandstone, or may be localised sands or river gravels in valley bottoms underlain by less permeable rocks. Groundwater flooding takes longer to dissipate because groundwater moves much more slowly than surface water and will take time to flow away underground.

No information has been provided to suggest that the site is susceptible to groundwater flooding.

Sewer Surcharge:

Sewer flooding occurs when the sewer network cannot cope with the volume of water that is entering it. It is often experienced during times of heavy rainfall when large amounts of surface water overwhelm the sewer network causing flooding. Temporary problems such as blockages, siltation, collapses and equipment or operational failures can also result in sewer flooding.

All Water Companies have a statutory obligation to maintain a register of properties/areas which have reported records of flooding from the public sewerage system, and this is shown on the DG5 Flood Register. This includes records of flooding from foul sewers, combined sewers and surface water sewers which are deemed to be public and therefore maintained by the Water Company. The DG5 register records of flood incidents resulting in both internal property flooding and external flooding incidents. Once a property is identified on the DG5 register, water companies can typically put funding in place to address the issues and hence enable the property to be removed from the register. It should be noted that flooding from land drainage, highway drainage, rivers/watercourses and private sewers is not recorded within the register.

No information has been provided to suggest that the site is susceptible to sewer surcharge flooding.

Other Sources:

The Natural Resources Wales Risk of Flooding from Reservoirs Map suggests that the site lies outside the "Maximum extent of flooding" from reservoir failure. The Natural Resources Wales also advise on their website that reservoir flooding is extremely unlikely. All major reservoirs have to be inspected by specialist dam and reservoir Engineers. These inspections are monitored and enforced by the Natural Resources Wales themselves. The risk to the site from reservoir flooding is therefore minimal and is far lower than that relating to the potential for fluvial flooding to occur.

There do not appear to be any further artificial (man-made) sources of flood risk (such as raised canals) in the vicinity of the site.

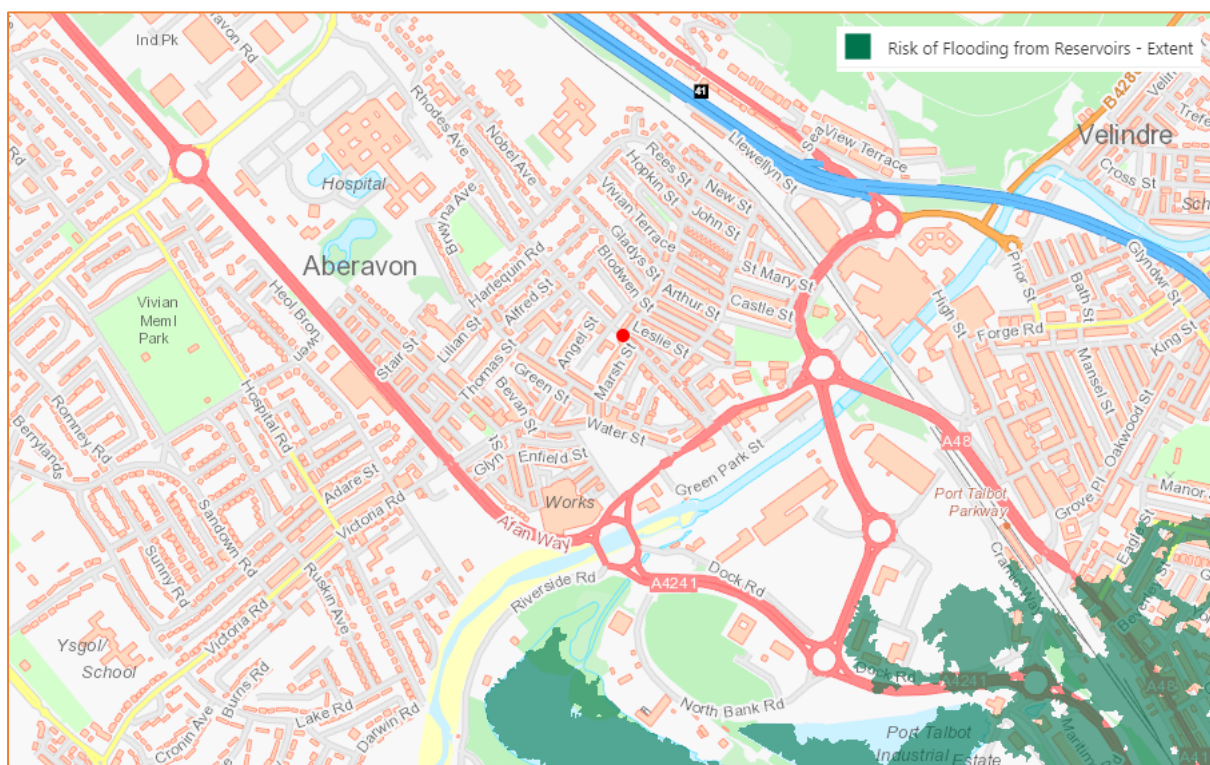


Figure 5: Extract from Natural Resources Wales risk of flooding from reservoirs (Source: NRW)

Flood Risk Management Measures

Vulnerability to flooding:

TAN15 classifies property usage by vulnerability to flooding.

The existing site is an empty plot.

Post development, the site will become a “less vulnerable development” on the ground floor, and “highly vulnerable development” on the above floor, as the application is for the Construction of a commercial unit with a single flat above.

Particular flooding consequences may not be acceptable for particular types of development. For example, allowing residential development in areas which are subject to high risks of flooding can result in a traumatic impact on people's lives. The precautionary framework identifies the vulnerability of different land uses to flooding, and for this purpose, development has been subdivided into three categories:

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

Table 2: Vulnerability to flooding categories

The Emergency Services category describes facilities which need to be operational and accessible at all times. Highly vulnerable development describes development where the ability of occupants to decide on whether they wish to accept the risks to life and property associated with flooding, or be able to manage the consequences of such a risk, is limited. It also includes those industrial uses where there would be an attendant risk to the public and the water environment should the site be inundated. Less vulnerable development describes development where the ability of occupants to decide on whether they wish to accept such risks is greater than that in the highly vulnerable category. The vulnerability attributed to a mixed use proposal will be defined by the most vulnerable use.

There are uses which are considered to be exceptions to the general rule, and have not been classified above, because they are required in a fluvial, tidal or coastal location by virtue of their nature. These include boatyards, marinas, essential works required at mooring basins, and development associated with canals.

Physical Design Measures:

In accordance with section A1.14 of TAN15 there is a frequency threshold of flooding below which flooding of development should not be allowed. The following table, taken from TAN15, provides indicative guidance as to what the frequency threshold could be for different types of development in terms of annual probability of occurrence:

Type of development	Threshold frequency	
	Fluvial	Tidal
Residential	1%	0.5%
Commercial / retail	1%	0.5%
Industrial	1%	0.5%
Emergency services	0.1%	0.1%
General infrastructure	1%	0.5%

Table 3: TAN15 Flood frequency thresholds

The site is shown to be entirely outside of the defended 1:100 year modelled flood extent at the present day.

The site is currently protected by flood defences but in the event that these were breached or overtopped the site would be susceptible to flooding, for return periods in excess of the present day 1:100 year event. For the defended 1:100 year event with allowance for climate change the site could be inundated with up to 0.6m of floodwater. For the undefended 1:100 year event with an allowance for climate change the site could be inundated with over 2.0m of floodwater. For the 1:1000 year event the site could be inundated with up to 1m of floodwater for the defended scenario, and over 2.0m for the undefended scenario.

It is recommended that finished ground floor levels for the commercial unit are raised by 300mm above existing levels, wherever possible. All residential uses will be at first floor level or above. With a standard floor to ceiling height of at least 2.4m, the first floor level will be approximately 2.7m above site level. All residential uses will therefore be dry for the design event.

The depth of flooding on site for the defended 1:100 year event with allowance for climate change is 600mm, with a velocity of 0.15m/s. This is below the tolerable allowances in TAN15.

To help protect against flooding during extreme events, the applicant has agreed to implement flood resistant design measures into the proposed building, in consultation with the Local Authority building control department.

These measures can include the following:

- Solid concrete ground floor slab, with waterproof membrane;
- Waterproof screed used on floors;
- Closed-cell foam used in wall cavities;
- Waterproof ground floor internal render;
- External walls rendered resistant to flooding to first floor level;
- Exterior ventilation outlets, utility points and air bricks fitted with removable waterproof covers;
- Ground floor electrical main ring run from first floor level; and on separately switched circuit from first floor;
- Electrical incomer and meter situated at first floor level or above;
- Boilers, control and water storage / immersion installed at first floor level or above;
- Gas meter installed at first floor level or above;
- Plumbing insulation of closed-cell design;
- Non-return valves fitted to all drain and sewer outlets;
- Manhole covers secured;
- Anti-syphon fitted to all toilets;
- Built-in furniture units of solid, water resistant material;
- Use of MDF carpentry (i.e. skirting, architrave, built-in storage) avoided at ground floor level;
- Stairs of solid hardwood construction with wood faces treated to resist water penetration.

Safe Escape:

TAN 15 requires a route of safe escape for all residents and users to be provided from new residential properties in flood zone C1.

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

Figure 6: Extract from TAN15 (Source: A1.15, Tan15)

In accordance with section A1.15 of TAN15 for residential access the maximum allowable depth of flooding in 600mm, and maximum velocity of 0.3m/s for the 1:100 year event with allowance for climate change.

The site is entirely outside of all the defended modelled scenarios. The maximum depth of flooding at the site is 0.25m, with a velocity of 0.3m/s for the undefended 1:100 year event with allowance for climate change.

The depth of flooding on site for the defended 1:100 year event with allowance for climate change is 600mm, with a velocity of 0.15m/s. This is below the tolerable allowances in TAN15.

The modelled flood depth and flood velocity maps provided by NRW shows that an escape route can be provided with a flood depth of below 600mm and a flood velocity of under 0.3m/s for the 1:100 year event with allowance for climate change, including the presence of flood defences.

Site users should exit the site and travel northwest along Julian Terrace, then southwest along Angel Street, and continue west along Sandfields Road.

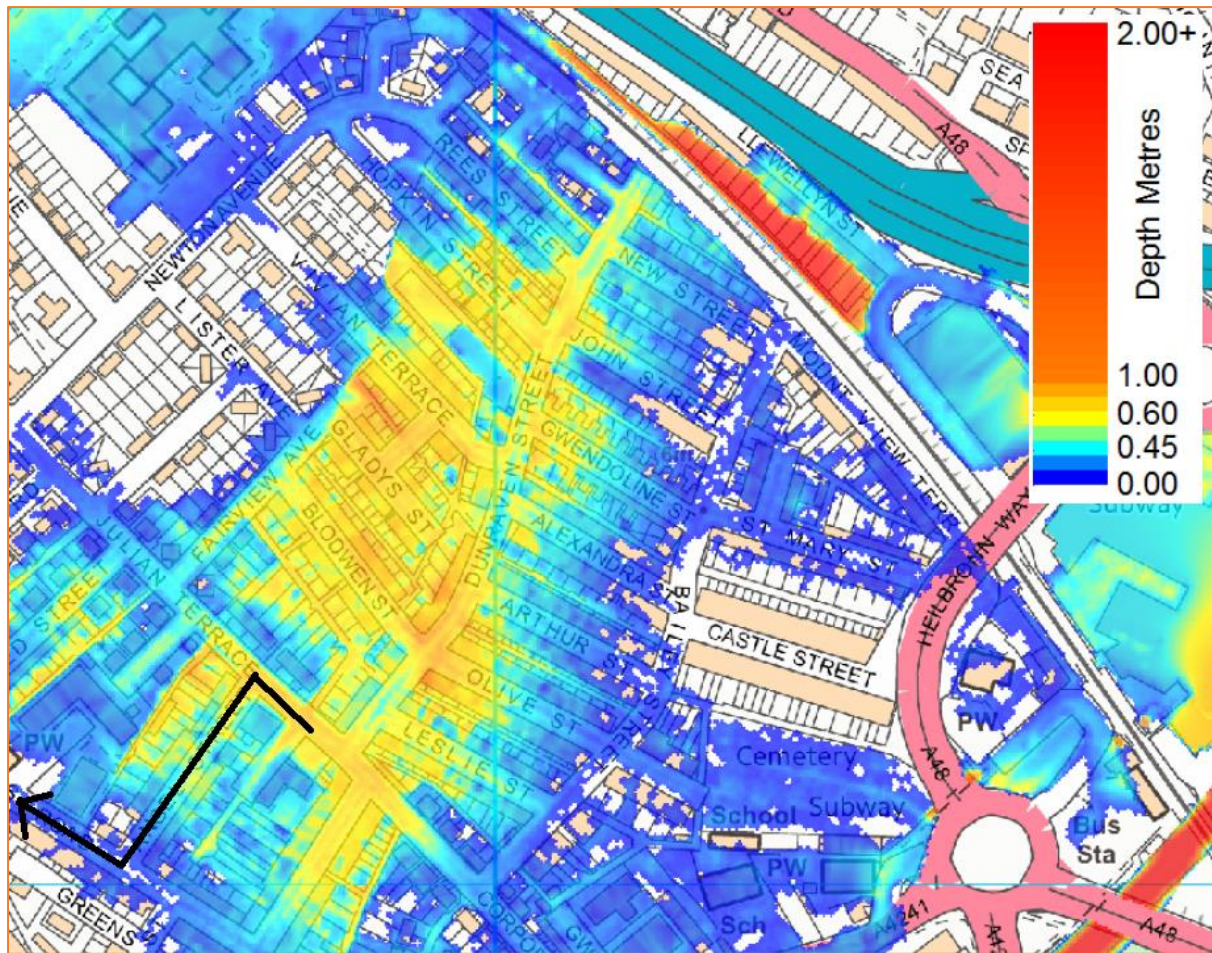


Figure 7: Depth Map for defended 1% AEP (1 in 100) year event with allowance for climate change, showing escape route
(Source: NRW)

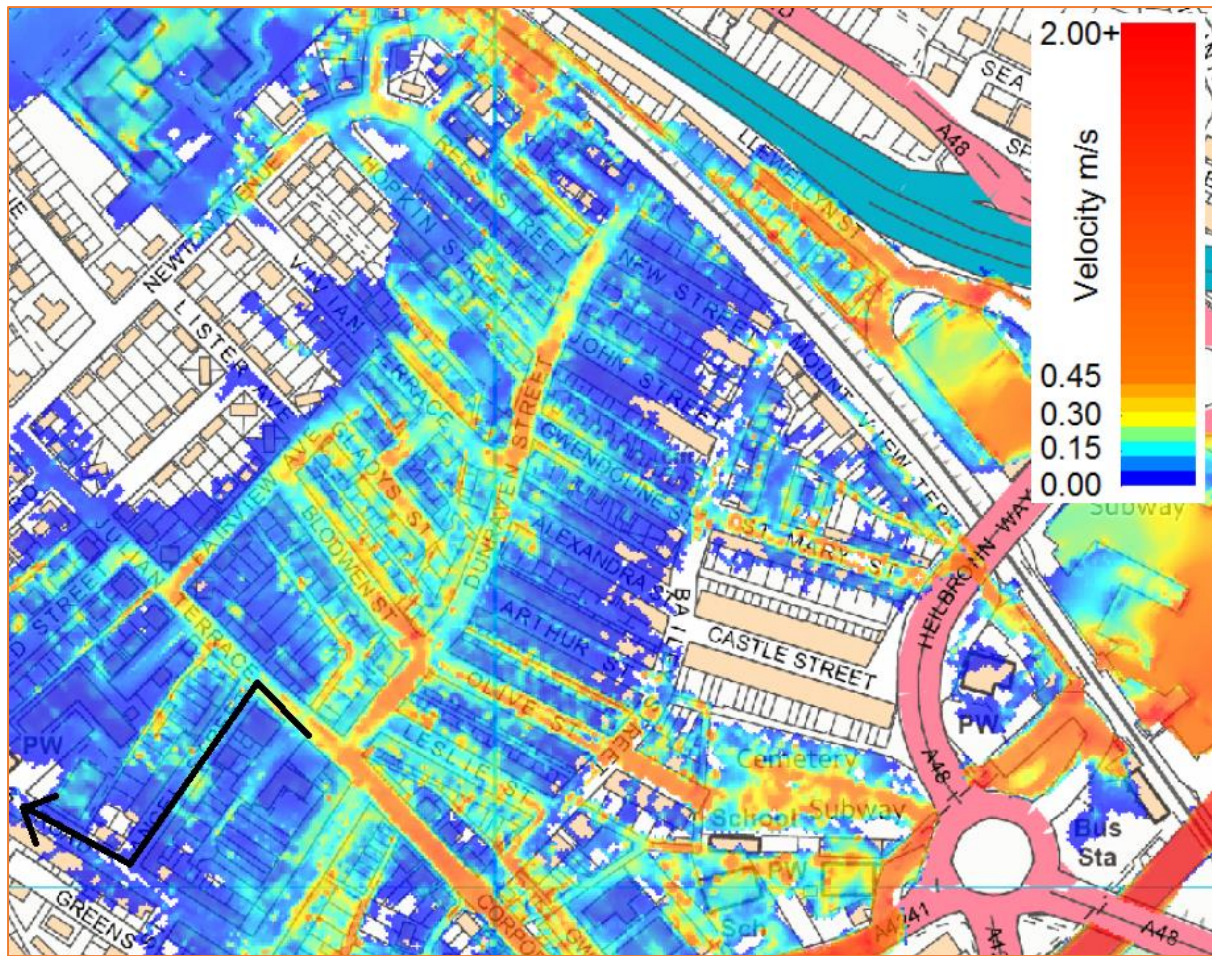


Figure 8: Velocity Map for defended 1% AEP (1 in 100) year event with allowance for climate change, showing escape route
(Source: NRW)

Flood Warnings:

The applicant has agreed to implement a flood warning and evacuation plan post development, and subscribe to the NRW's flood warning service.

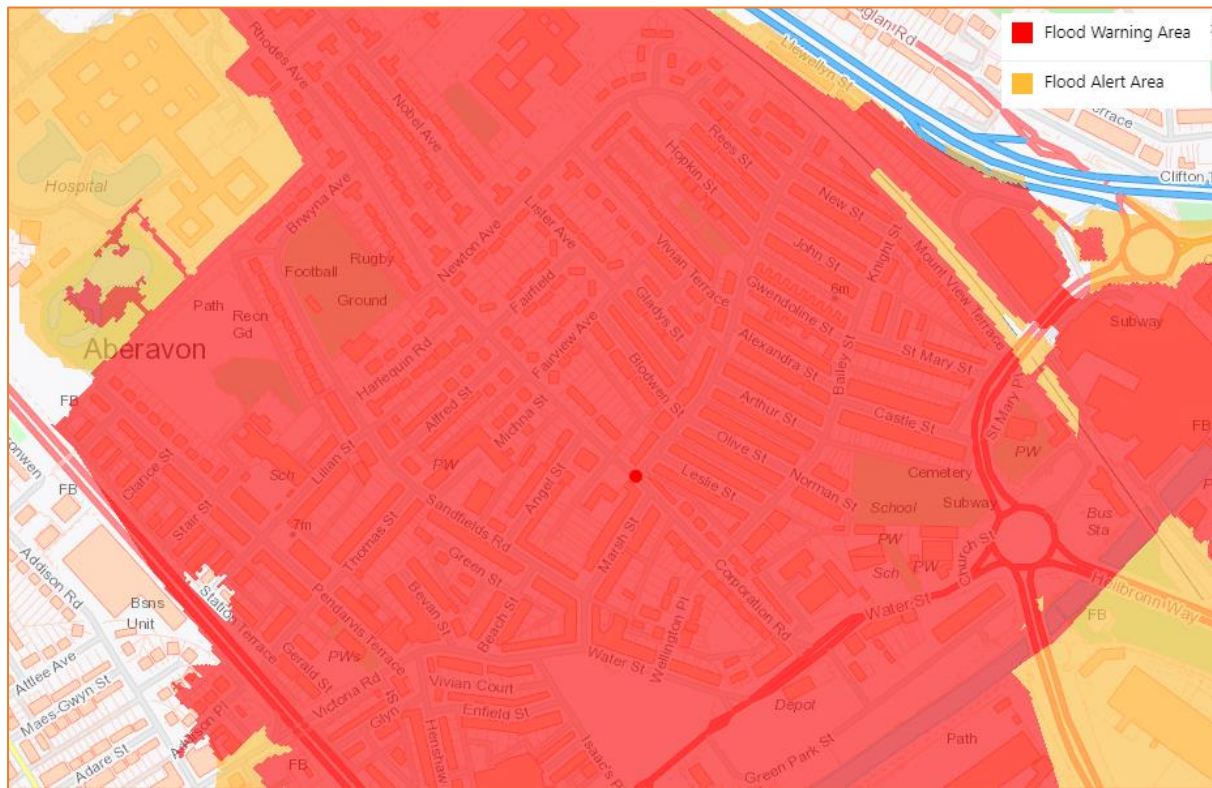


Figure 9: NRW Flood Alert and Flood Warning areas (Source: NRW)

The flood warning service has three types of warnings that will help you prepare for flooding and take action:

Flood Warning	Flood Alert	Flood Warning	Severe Flood Warning
			
What it means?	Flooding is possible. Be prepared.	Flooding is expected. Immediate action required.	Severe flooding. Danger to life.
When it's used?	Two hours to two days in advance of flooding.	Half an hour to one day in advance of flooding.	When flooding poses a significant threat to life.
What to do?	Be prepared to act on your flood plan. Prepare a flood kit of essential items. Monitor local water levels and the flood forecast on our website.	Move family, pets and valuables to a safe place. Turn off gas, electricity and water supplies if safe to do so. Put flood protection equipment in place.	Stay in a safe place with a means of escape. Be ready should you need to evacuate from your home. Co-operate with the emergency services. Call 999 if you are in immediate danger.

Flood Plan:

It is recommended that the applicant and future owners, occupiers and Landlords of the proposed units prepare a flood plan to protect life and property during a flood event:

Before a flood:

- Find out if you are at risk of flooding.
- Find out if you can receive flood warnings.
- Prepare and keep a list of all your important contacts to hand or save them on your mobile phone.
- Think about what items you can move now and what you would want to move to safety during a flood such as pets, cars, furniture, and electrical equipment.
- Know how to turn off gas, electricity and water supplies.
- Prepare a flood kit of essential items and keep it handy. It can include copies of important documents, a torch, a battery-powered or wind-up radio, blankets and warm clothing, waterproofs, rubber gloves and a first aid kit including all essential medication.
- Consider buying flood protection products such as flood boards and airbrick covers to help reduce flood water getting into your property.

During a flood:

- Tune into your local radio station on a battery or wind-up radio.
- Fill jugs and saucepans with water.
- Grab your flood kit - if you have prepared one.
- Collect blankets, torch, first aid kit, medication and food.
- Move important documents, personal items, valuables, and lightweight belongings upstairs or to high shelves.

- Raise large items of furniture, or put them in large bags if you have them.
- Move people, outdoor belongings, cars and pets to higher ground.
- Switch off water, gas and electricity at mains when water is about to enter your home. Do not touch sources of electricity when standing in water.
- Fit flood protection products, if you have them, for example flood boards, airbrick covers, sandbags.
- Put plugs in sinks and baths. Weigh them down with a pillowcase or plastic bag filled with soil.
- If you do not have non-return valves fitted, plug water inlet pipes with towels or cloths.
- Move your family and pets upstairs or to a high place with a means of escape.
- Listen to the advice of the emergency service and evacuate if told to do so.
- Avoid walking or driving through flood water. Six inches of fast-flowing water can knock over an adult and two feet of water can move a car.

After a flood:

- If you have flooded, contact your insurance company as soon as possible.
- Take photographs and videos of your damaged property as a record for your insurance company.
- If you don't have insurance, contact your local authority for information on grants and charities that may help you.
- Flood water can contain sewage, chemicals and animal waste. Always wear waterproof outerwear, including gloves, wellington boots and a face mask.
- Have your electrics, central heating and water checked by qualified engineers before switching them back on.

Off-Site Impacts

Floodplain storage:

TAN15 requires that where development is proposed in undefended areas of floodplain, which lie outside of the functional floodplain, the implications of ground raising operations for flood risk elsewhere needs to be considered. Raising existing ground levels may reduce the capacity of the floodplain to accommodate floodwater and increase the risk of flooding by either increasing the depth of flooding to existing properties at risk or by extending the floodplain to cover properties normally outside of the floodplain. Flood storage capacity can be maintained by lowering ground levels either within the curtilage of the development or elsewhere in the floodplain, in order to maintain at least the same volume of flood storage capacity within the floodplain.

In undefended tidal areas, raising ground levels is unlikely to impact on maximum tidal levels so the provision of compensatory storage should not be necessary.

For development in a defended flood risk area, the impact on residual flood risk to other properties needs to be considered. New development behind flood defences can increase the residual risk of flooding if the flood defences are breached or overtopped by changing the conveyance of the flow paths or by displacing flood water elsewhere. If the potential impact on residual risk is unacceptable then mitigation should be provided.

Surface Water Drainage Strategy:

The development will utilise sustainable urban drainage design in accordance with TAN15 drainage hierarchy as follows:

1. Store rainwater for later use
2. Infiltration techniques
3. Attenuate rainwater by storing in tanks for gradual release
4. Discharge rainwater into surface water sewer
5. Discharge rainwater into a combined sewer
6. Attenuation of rainwater in ponds or open water features with controlled discharge into the local watercourse

Due to the scale of the development, a full Surface Water Drainage Strategy is not required at this stage of planning.

Conclusion

Unda Consulting Limited have been appointed by Mullai Group to undertake a Site Specific Flood Consequence Assessment (FCA) for Site Adjacent to Julian Terrace, Port Talbot SA12 6UE. The FCA has been undertaken in accordance with Technical Advice Note 15 (TAN 15) and the associated technical guidance.

The proposed planning application is for the Construction of a commercial unit with a single flat above. The existing site is an empty plot, which is understood to be used for car parking.

Post development, the site will become a “less vulnerable development” on the ground floor, and “highly vulnerable development” on the above floor, as the application is for the Construction of a commercial unit with a single flat above.

The site is located within Flood Zone C1 (Risk of flooding from rivers or the sea, served by significant flood defence infrastructure, including flood defences), which means it is defined as land having at least a 1 in 1000 annual probability of fluvial / tidal flooding. The risk would appear to originate from the River Avan / Afan approximately 360m to the southeast of the site.

Modelled flood levels and flood extents have been received from the NRW as part of a flood data request (NRW ref: ATI-16243a). The results summarised below are taken from 1D/2D Estry TUFLOW model for Port Talbot. The 1 in 100, 1 in 100 + climate change and 1 in 1000 in defended and un-defended scenarios have been provided. The site is shown to be entirely outside of the present day defended 1:100 year modelled flood extent, and will therefore remain dry during the modelled 1:100 year scenario at the present day.

The site is currently protected by flood defences but in the event that these were breached or overtopped the site would be susceptible to flooding, for return periods in excess of the present day 1:100 year event.

For the defended 1:100 year event with allowance for climate change the site could be inundated with up to 0.6m of floodwater. For the undefended 1:100 year event with an allowance for climate change the site could be inundated with over 2.0m of floodwater. For the 1:1000 year event the site could be inundated with up to 1m of floodwater for the defended scenario, and over 2.0m for the undefended scenario.

In accordance with section A1.15 of TAN15 for residential access the maximum allowable depth of flooding in 600mm, and maximum velocity of 0.3m/s for the 1:100 year event with allowance for climate change.

The site is entirely outside of all the defended modelled scenarios. The maximum depth of flooding at the site is 0.25m, with a velocity of 0.3m/s for the undefended 1:100 year event with allowance for climate change.

The depth of flooding on site for the defended 1:100 year event with allowance for climate change is 600mm, with a velocity of 0.15m/s. This is below the tolerable allowances in TAN15. The modelled flood depth and flood velocity maps provided by NRW shows that an escape route can be provided with a flood depth of below 600mm and a flood velocity of under 0.3m/s for the 1:100 year event with allowance for climate change, including the presence of flood defences.

Site users should exit the site and travel northwest along Julian Terrace, then southwest along Angel Street, and continue west along Sandfields Road.

The Natural Resources Wales Surface Water Flood Map suggests that the site lies within an area of “Medium” and “Low” risk of flooding from surface water. Additionally, the risk of flooding posed to the site by groundwater, and sewer surcharge flooding would appear to be low.

In summary:

- Flood Zone C1 as defined by Natural Resource Wales (NRW).
- Fluvial / Tidal risk originating from the River Avan / Afan.

- The site is shown to be entirely outside of the present day defended 1:100 year modelled flood extent, and will therefore remain dry during the modelled 1:100 year scenario at the present day.
- The depth of flooding on site for the defended 1:100 year event with allowance for climate change is 600mm, with a velocity of 0.15m/s. This is below the tolerable allowances in TAN15.
- Risk of groundwater and sewer surcharge flooding would appear to be low.
- The Natural Resources Wales Surface Water Flood Map suggests that the site lies within an area of "Medium" and "Low" risk of flooding from surface water.
- Flood depths do not exceed 600mm at the site or along the escape route, and safe escape as per the requirements of TAN15 can be provided.
- Flood proofing of the building will be incorporated as appropriate.
- A flood warning and evacuation plan will be implemented post development.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

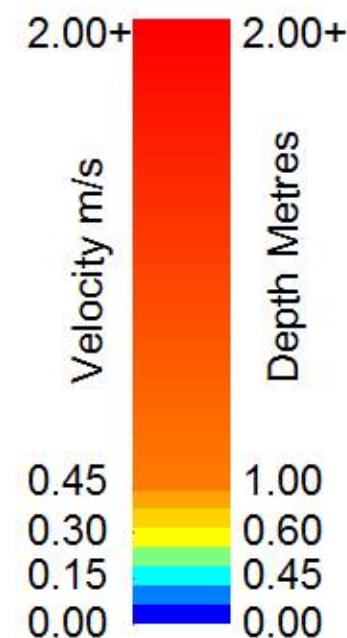
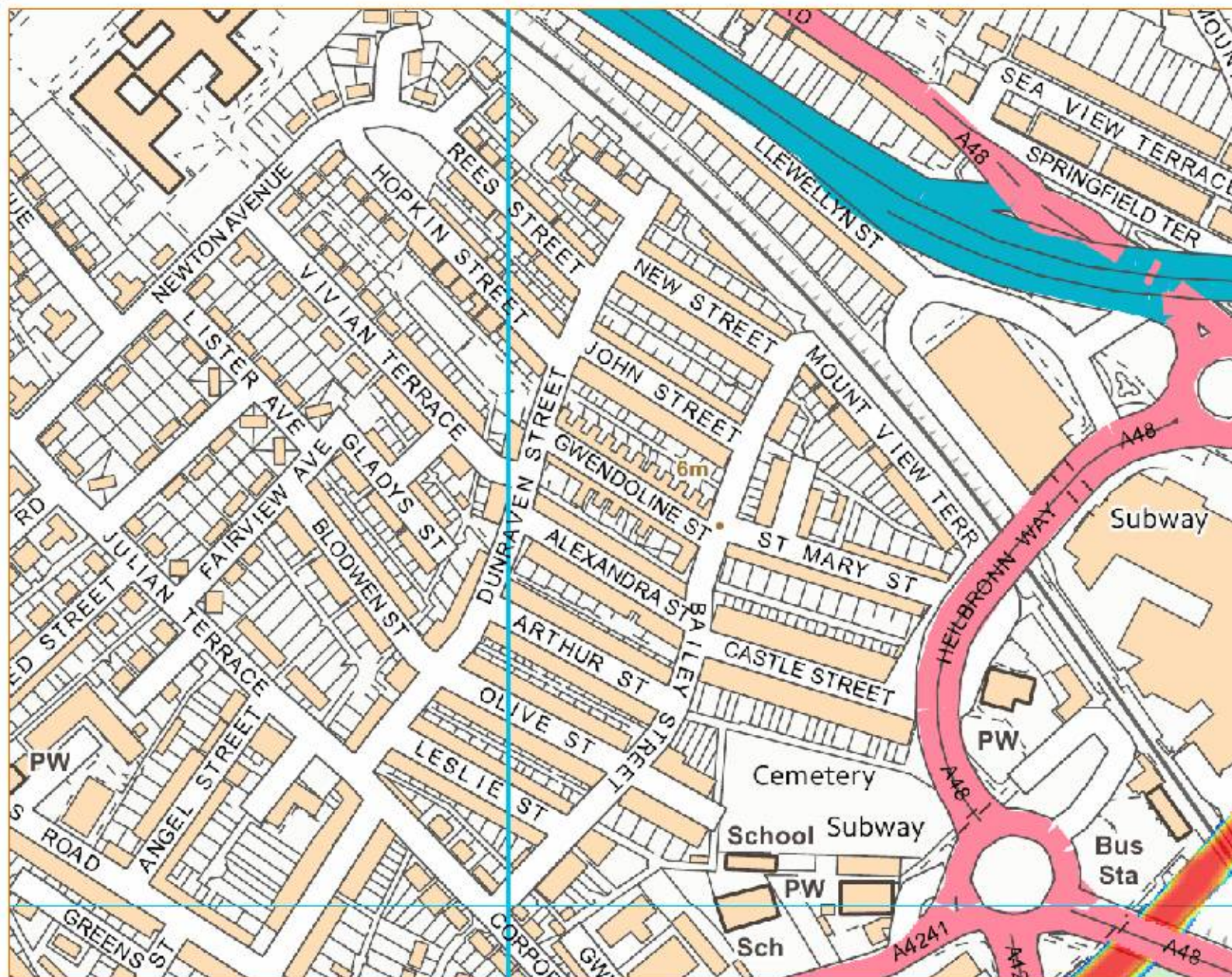
Appendix

- NRW Flood Data (12 pages)

FRA/FCA Map centred on Port Talbot for the 1 in 100 chance of flooding at that location in any given year.
Defended Depth Scenario

1:3500

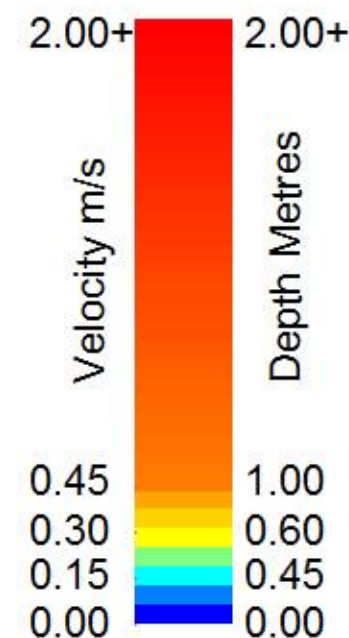
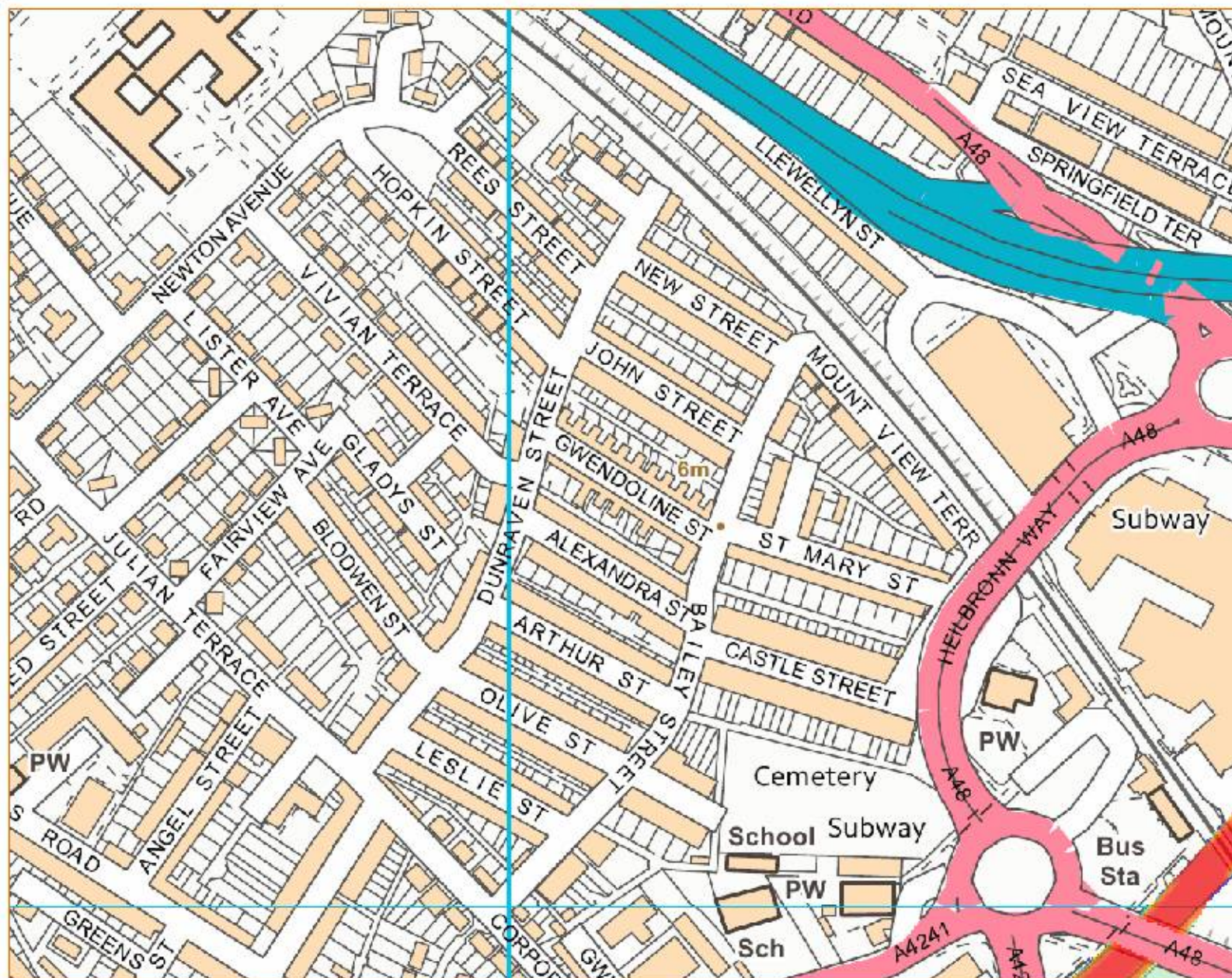
Please note that levels/velocities supplied are for guidance only and should not be used without supplementary information



FRA/FCA Map centred on Port Talbot for the 1 in 100 chance of flooding at that location in any given year.
Defended Velocity Scenario

1:3500

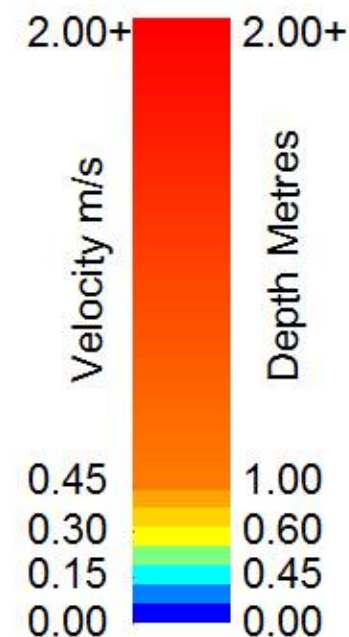
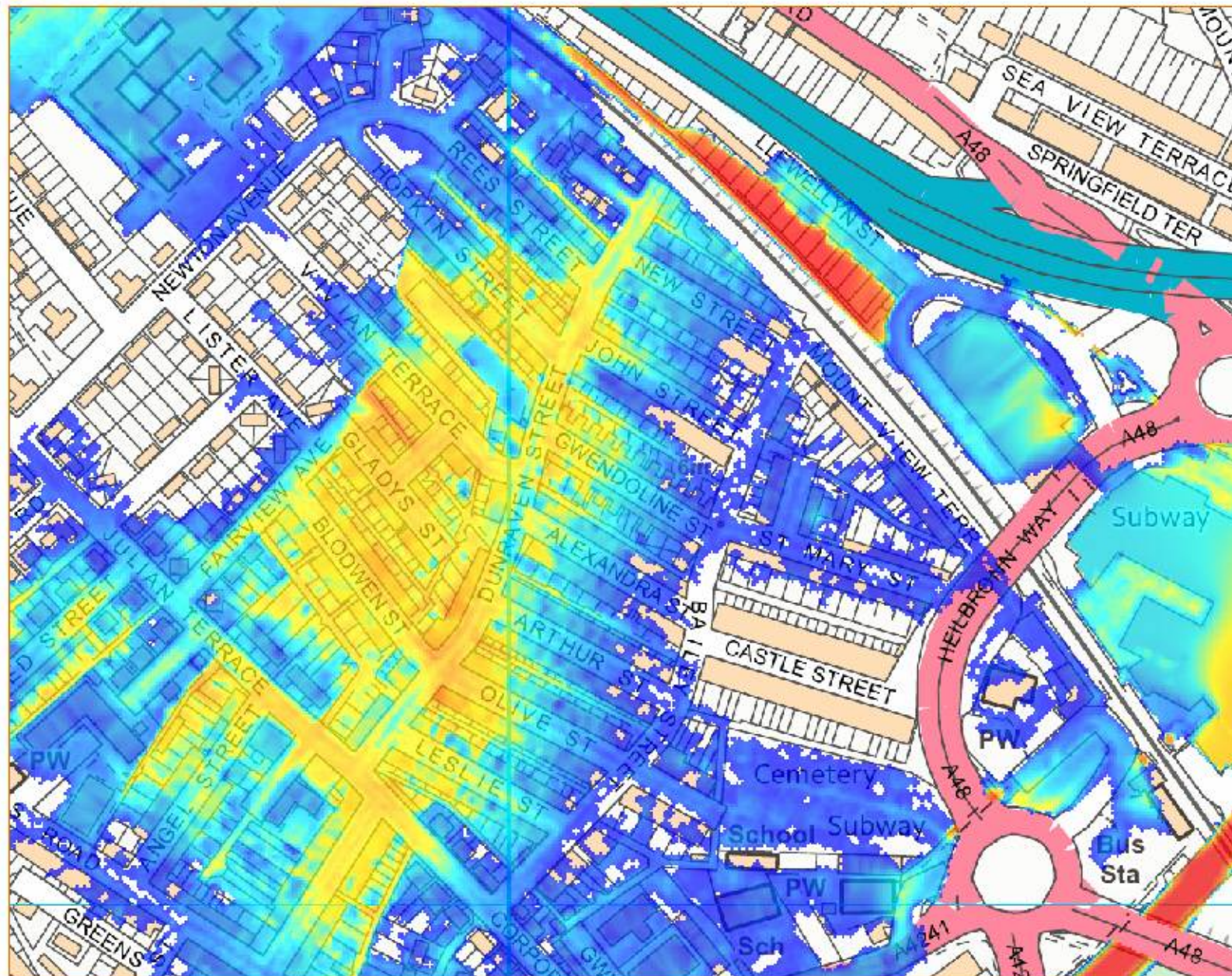
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FRA/FCA Map centred on Port Talbot for the 1 in 100 chance of flooding at that location in any given year.
Defended Climate Change Depth Scenario

1:3500

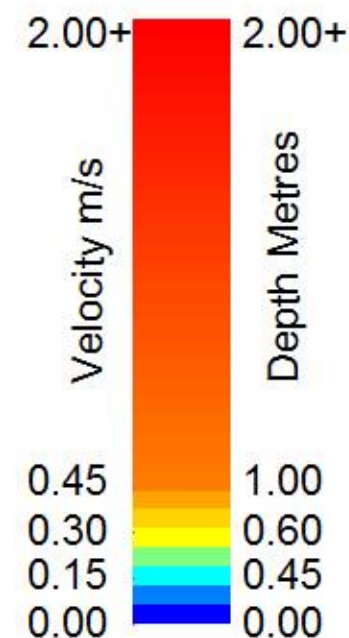
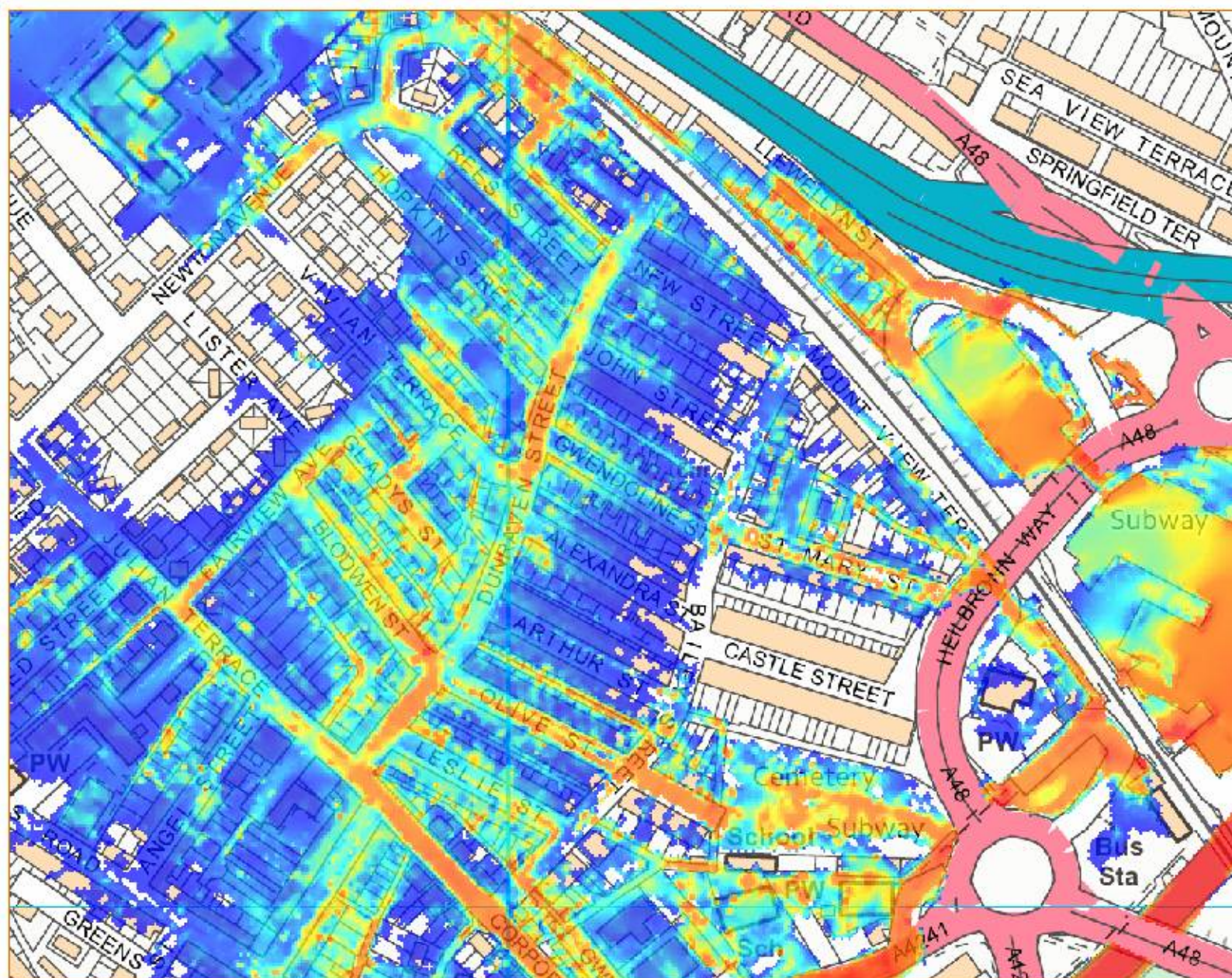
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FRA/FCA Map centred on Port Talbot for the 1 in 100 chance of flooding at that location in any given year.
Defended Climate Change Velocity Scenario

1:3500

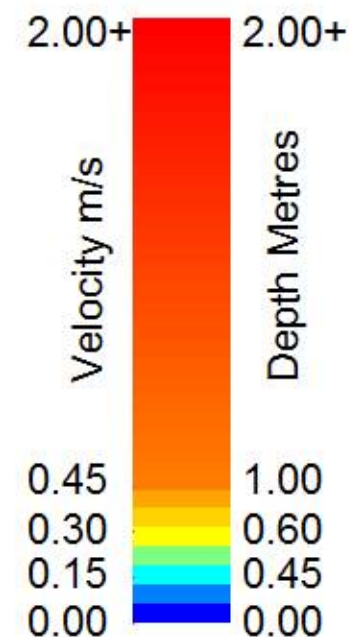
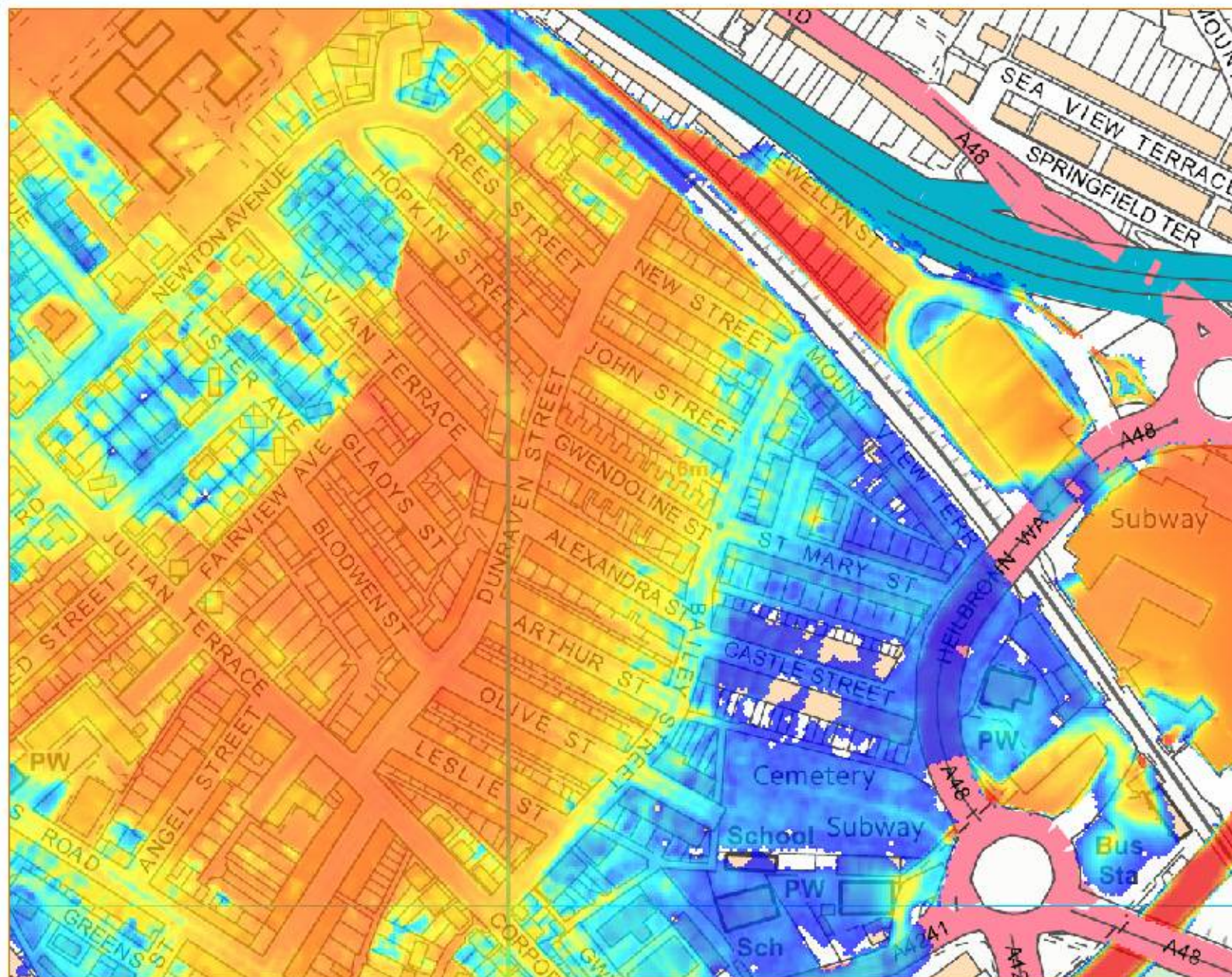
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**FRA/FCA Map centred on Port Talbot for the 1 in 1000 chance of flooding at that location in any given year.
Defended Depth Scenario**

1:3500

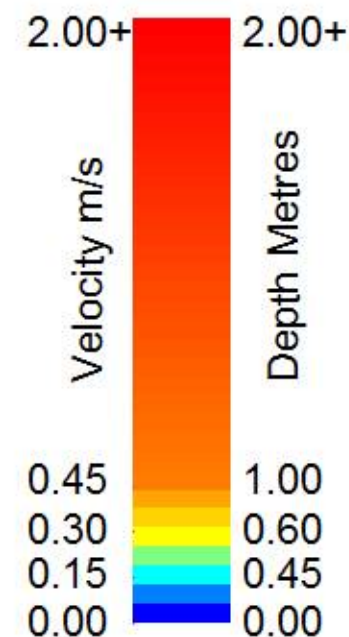
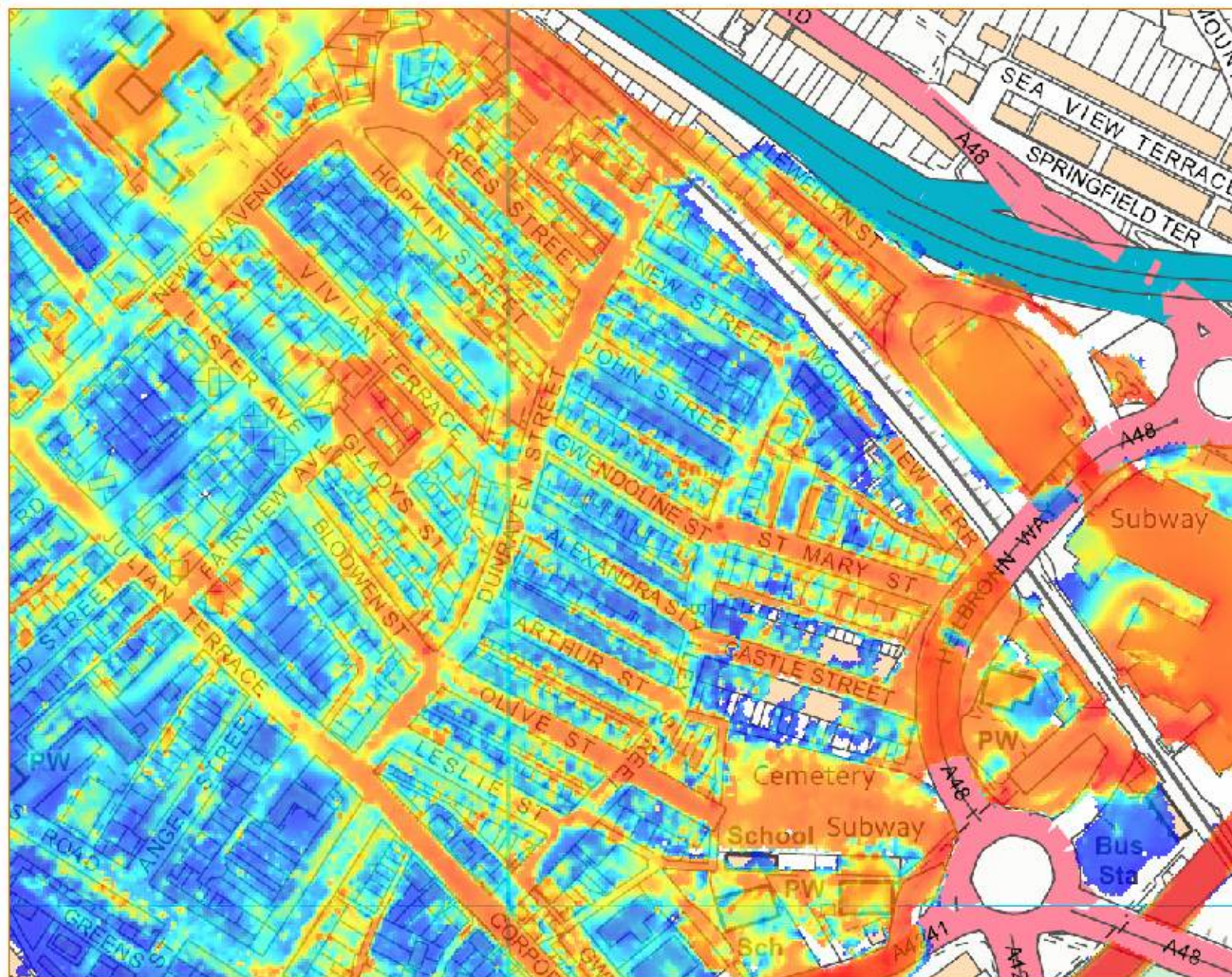
Please note that levels/velocities supplied are for guidance only and should not be used without supplementary information



FRA/FCA Map centred on Port Talbot for the 1 in 1000 chance of flooding at that location in any given year.
Defended Velocity Scenario

1:3500

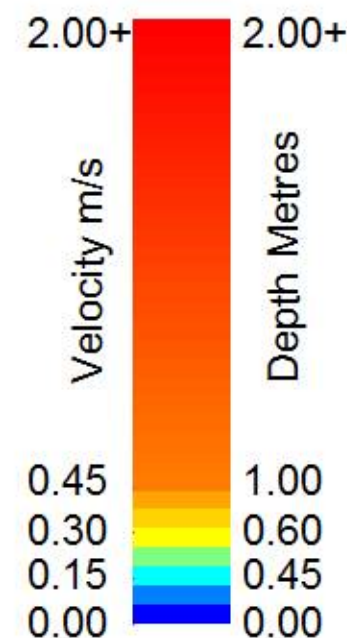
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**FRA/FCA Map centred on Port Talbot for the 1 in 100 chance of flooding at that location in any given year.
Undefended Depth Scenario**

1:3500

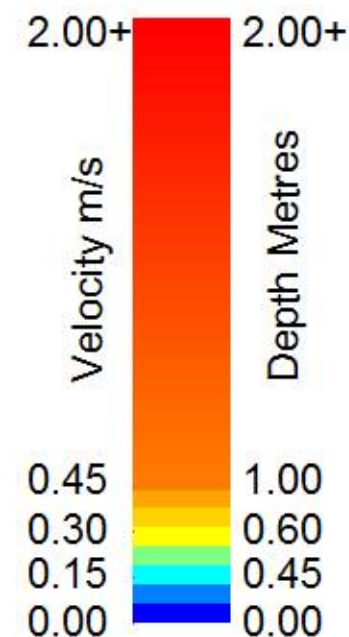
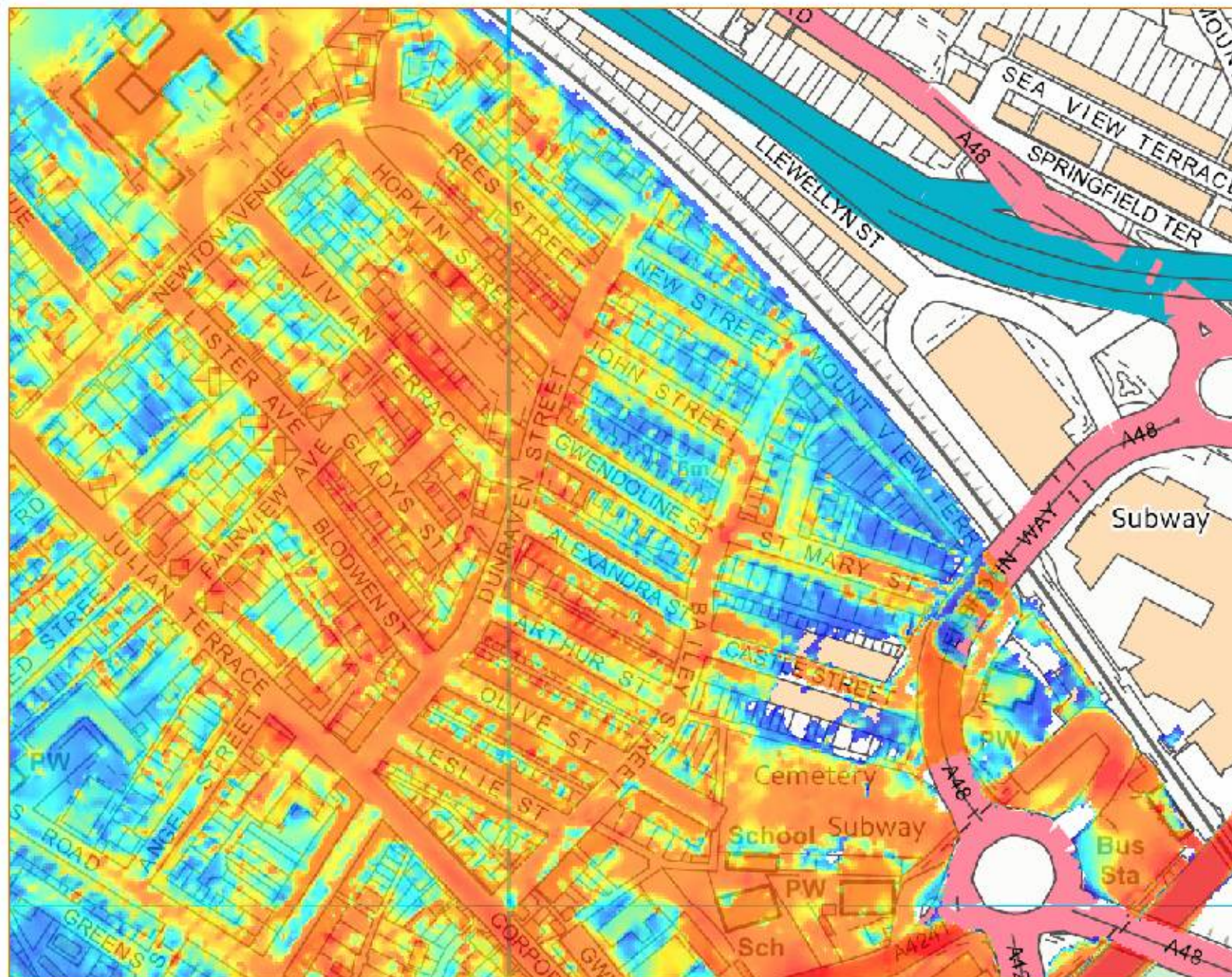
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FRA/FCA Map centred on Port Talbot for the 1 in 100 chance of flooding at that location in any given year.
 Undefended Velocity Scenario

1:3500

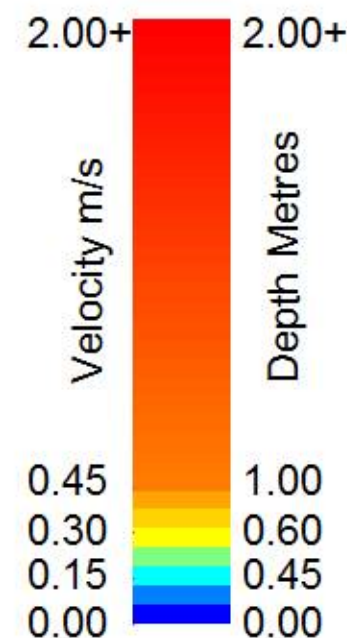
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FRA/FCA Map centred on Port Talbot for the 1 in 100 chance of flooding at that location in any given year.
 Undefended Climate Change Depth Scenario

1:3500

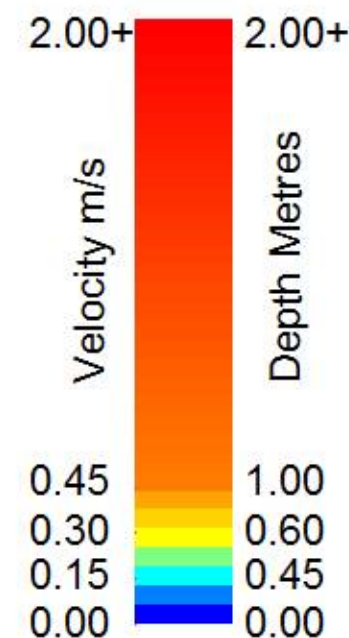
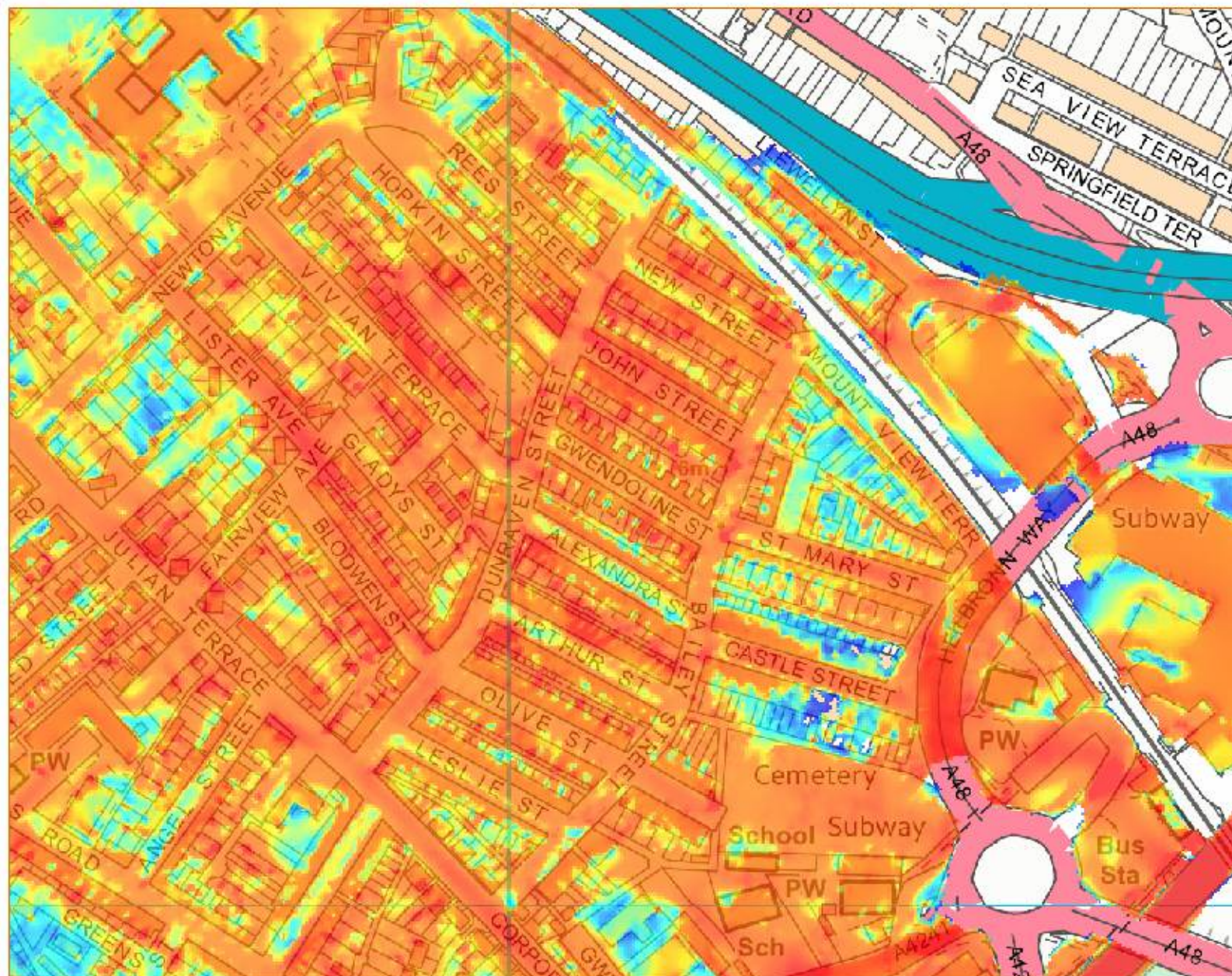
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FRA/FCA Map centred on Port Talbot for the 1 in 100 chance of flooding at that location in any given year.
 Undefended Climate Change Velocity Scenario

1:3500

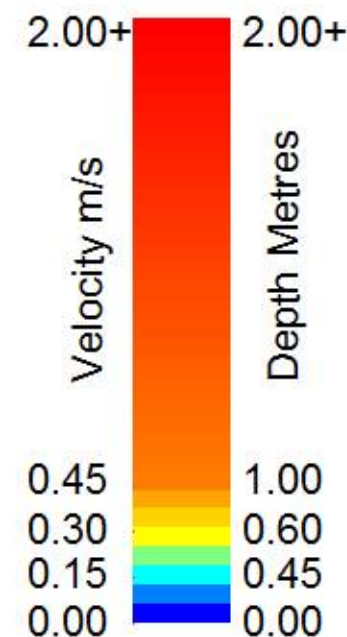
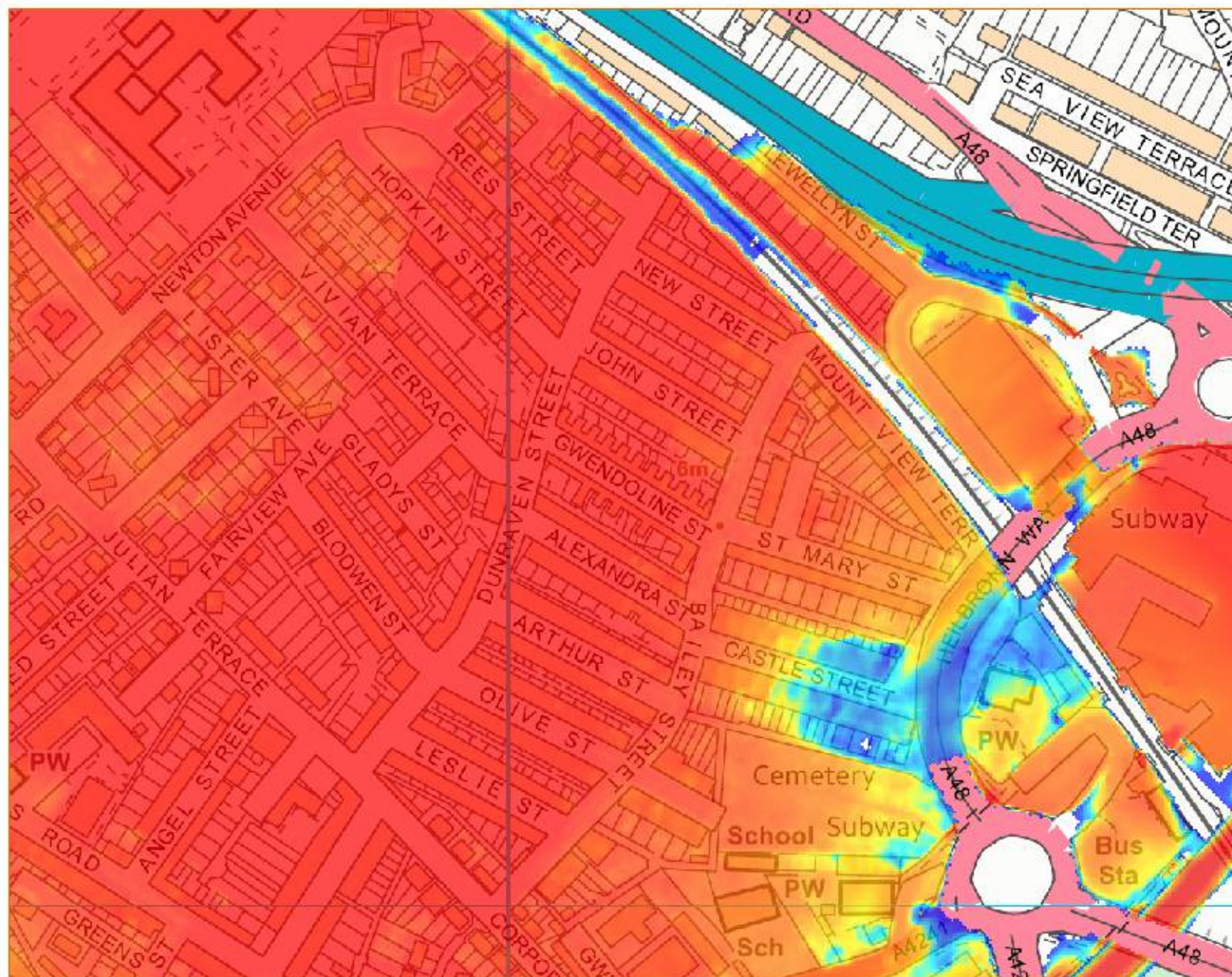
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FRA/FCA Map centred on Port Talbot for the 1 in 1000 chance of flooding at that location in any given year.
 Undefended Depth Scenario

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FRA/FCA Map centred on Port Talbot for the 1 in 1000 chance of flooding at that location in any given year.
 Undefended Velocity Scenario

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