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DRAINAGE STRATEGY & FLOOD RISK

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1 Introduction

- 1.1 Austin Partnership have been appointed by Tilbury Douglas, to provide Civil and Structural Engineering advice and design for the conversion and renovation of the Education Library Resource Service (ELRS) building in Port Talbot, into a new skills hub.
- 1.2 The new facility is intended to provide a central hub to local schools, for pupils to come and experience a range of skills-based learning and vocational opportunities.
- 1.3 The scheme proposes ambitious sustainability targets for both operational and embodied carbon, which will form a key part of the design methodology.
- 1.4 The property postcode is SA13 1YY and the grid reference is SS77093. The location is shown on a satellite image in Figure 1. The property is situated between Reginald Street and Villiers Street.

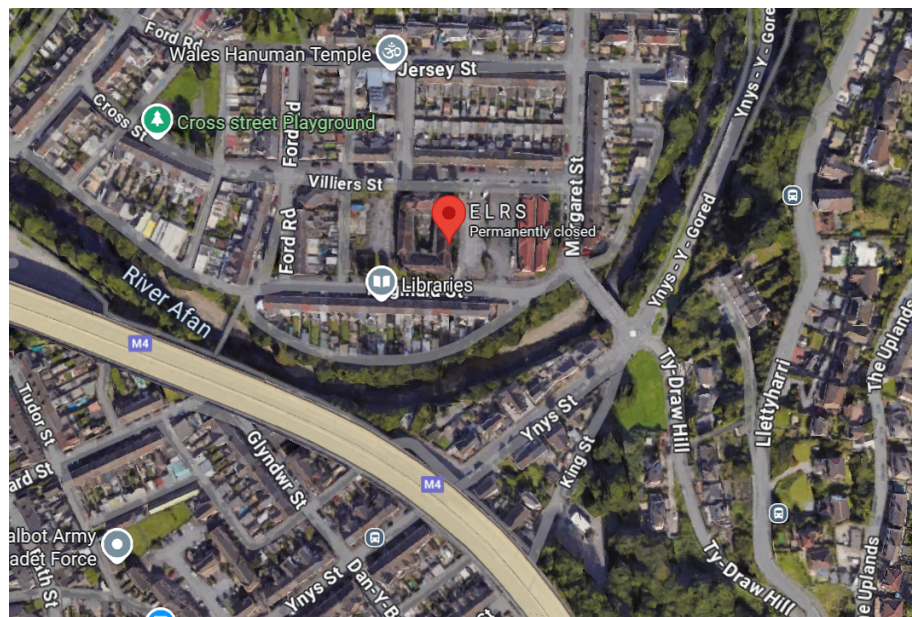


Figure 1: Location of the ELRS Building, Port Talbot (from Google maps)

- 1.5 The contents of this report have been based on the latest architectural proposals, received on the 8th July 2025.

2 Site Investigation

- 2.1** A desk top study and ground investigation report has been prepared by Tetra Tech (Reference – 784-B071864-V1.1) issued in August 2025.
- 2.2** According to the BGS mapping, the geology of the site is described as *“underlain by superficial deposits of Alluvial Fan Deposits. These are expected to be coarse grained with occasional clays along with the possibility of both cobbles and boulders. The bedrock geology of the site consists of the Swansea Member. These strata are described as Green-grey lithic arenites (Pennant sandstones) with thin mudstone/siltstone and seatearth interbeds and mainly thin coals. Bolsovian to Asturian. The geology can be identified within British Geological Survey (BGS) Sheet No. 247 Swansea Solid and Drift Edition 1:50 000 scale.”*
- 2.3** The ground conditions have been described as asphalt, made ground and alluvial fan deposits following the intrusive ground investigation. Groundwater was encountered during the site investigation at 3.30m bgl rising to as high as 2.77m bgl.
- 2.4** In regard to ground contamination, the report refers to *“elevated concentrations of potential contaminants have been recorded in soil samples obtained from the site when compared to a public open space end user scenario. However, it is noted that the proposed development consists of a building and areas of hard standing and as such the interaction with the near surface soils will be limited. If areas of soft landscaping are incorporated into the design, to which the pupils will have access, consideration should be given to the importation of clean soil or surfacing in these areas. With regards to the risk to controlled waters the recorded exceedances in soil derived leachate samples are not considered to represent a significant risk to the wider environment and as such further risk management procedures are not considered necessary.”*
- 2.5** In regard to ground gases, the report refers to *“the site has been classified as Characteristic Situation 1 (Very Low Risk) based on the worst case recorded concentrations of carbon dioxide and methane and maximum flow rates. Site classification of a Characteristic Situation 1 indicated gas protection measures are not required within new developments.”*
- 2.6** Soil infiltration testing was undertaken within the Alluvial Fan Deposits, in accordance with the BRE 365 methodology. Refer to Figure 2 for the site locations of the three soakaway tests.
- 2.7** An extract of the summarised soil infiltration test results are shown in Figure 3.
- 2.8** Soakaway testing within the shallow Alluvial Fan Deposits at SA01, SA02 and SA03 yielded soil infiltration values between 2.63×10^{-2} and 6.00×10^{-4} . Therefore, soakaway drainage is deemed viable for the development.



Figure 2: Soakaway test locations shown as SA01, SA02 and SA03

Location	Depth (mbgl)	Strata	Hydraulic Conductivity (m/sec)		
			Test 1	Test 2	Test 3
SA01	1.90	Alluvial Fan Deposits	2.63×10^{-2}	2.63×10^{-2}	6.00×10^{-4}
SA02	1.60	Alluvial Fan Deposits	1.69×10^{-4}	1.50×10^{-4}	1.21×10^{-4}
SA03	2.00	Alluvial Fan Deposits	6.00×10^{-4}	4.02×10^{-4}	2.92×10^{-4}

Figure 3: Extract from Tetra Tech site investigation report with soakaway test results

3 Below Ground Drainage – Surface Water

- 3.1** It is proposed to utilise Sustainable Drainage Systems (SuDS) to manage surface water runoff from the proposed development in line with current best practice and guidelines.
- 3.2** The proposed development is for the internal alterations and refurbishment of the former ELRS building. The demolition of small outbuildings and the removal of the existing parking areas and other hardstanding areas externally.
- 3.3** The existing internal courtyard is planned to be covered and converted into a biophilic courtyard with drainage from these planted areas connected to the existing internal drainage.
- 3.4** Externally a new carpark and drop-off area is planned with soft landscaping. The permanently surfaced areas are planned to be laid with falls towards a large volume Bio-remediation drainage channel, with integrated filter media. This will both treat and store runoff volumes at source before either discharging to the surface water system, or directly discharge to ground, dependent upon percolation viability of the site (yet to be officially confirmed).

- 3.5** Other external area changes proposed are for ‘Construction Skills Areas’ where manual construction skills will be taught, such as brick laying, plastering etc. Due to the nature of these areas all drainage proposals would be geared towards the discharge via drainage channels and inspection chambers with sumps, to foul water drainage systems.
- 3.6** A further small parking area is planned on the northwest corner of the site, where surface water drainage will be collected by a standard drainage channel connected to a surface water system leading to the proposed open infiltration / drainage feature in the southwest corner of the site. The final detail of this large SuDS feature will be determined by the site-specific infiltration and the clients’ requirements, but it provide several biodiversity benefits and an aesthetically pleasing feature to the development.
- 3.7** Our surface water drainage proposals, which will form the basis of our drainage strategy, are as follows.
- 3.8** The Flood and Water Management Act 2010 (Schedule 3) requires new developments to include Sustainable Drainage Systems (SuDS) features that comply with national standards. All new developments of more than one dwelling or where the area covered by construction work equals or exceeds 100 square metres require approval before construction can commence from the SuDS Approval Body (SAB).
- 3.9** The Welsh Government statutory standards for SuDS contains a set of principles which must be applied in the design of any surface water drainage scheme to obtain approval from the SAB Body.
- 3.10** There are six SuDS Standards, **Standard S1** is a Hierarchy Standard which gives criteria for prioritising the choice of runoff destination, while **S2 to S6** are Fixed Standards. The fixed standards state the minimum design criteria, how SuDS should be built, maintained, and operated.

Standard S1 – Runoff destination

The runoff destination should be prioritised as follows:

- a. Collect for reuse: Formal rainwater harvesting (RWH) will most likely be discounted for the project due to most of the work being internal alterations, however this will need to be confirmed.
- b. Infiltrated to ground: Dependent upon onsite percolation testing, infiltration could be used to dispose of surface water runoff from the proposed parking areas through the planned Bio-remediation channel and also via the planned infiltration basin. Should infiltration not be viable, both of the SuDS features mentioned above can be altered to discharge into surface water drainage systems.
- c. Discharge to a surface water body: The nearest watercourse would be the River Afan some 40 -50m away from the southern site boundary. Any

- direct connection to this is considered unviable due to the extent of civil engineering work involved and the crossing of third-party land.
- d. Discharge to a surface water sewer, highway drain: From information currently provided there appears to be no surface water sewers in close proximity to the development site.
 - e. Discharged to a combined sewer: Currently all site drainage becomes combined prior to it being discharged offsite, into local combined sewers. Therefore, any new connections to the current onsite drainage would effectively discharge into a combined sewer.

Standard S2 – Hydraulic Control

In its present form over 95% of the site is impermeable and drained via a series of gullies to the onsite drainage system. In contrast, the development proposals show large areas of soft landscaping which will reduce impermeable area to approximately 76% of the overall site area. In doing this the volumes of runoff directed to formal drainage will be greatly reduced and the construction of a large open SuDS feature will also contribute further by temporarily storing storm water volumes.

Drainage designs will be carried out at pre-construction phase with all surface water drainage designed to meet the SAB requirements for capacity during various storm durations, and include an agreed climate change factor, thus ensuring a fully compliant design for now and the future.

Standard S3 – Water Quality

As per Standard S2, the reduction in impermeable areas will contribute greatly to water quality by reducing the runoff volumes, which in turn reduces the risk of pollution reaching the sewers. Also, with the installation of the planned Bio-remediation channel to the main carpark surface water runoff can treat any pollutants before it is discharged.

Standard S4 – Amenity

Amenity value can be taken from the development itself, by providing a place of learning for the wider local community. Open areas of soft landscaping to the building external areas will provide students with a pleasant area to learn and relax. This also contributes to benefit to the local community in creating a more aesthetically pleasing development than the current 'sea of tarmac'. Also included in the design is a biophilic courtyard within the central courtyard of the existing building which will again provide a pleasant area to learn and relax whilst still being partially sheltered from the elements.

Standard S5 – Biodiversity

The soft landscaping and SuDS drainage feature will create biodiversity value to the development with the correct planting providing a focal point in this densely populated urban area. Encouraging plant life as well as birds and insects, and link to the local ecosystem.

Standard S6 – Construction, operation and maintenance

The planned surface water drainage system is minimal and at shallow depth, making construction, operation and maintenance simple and cost effective. All drainage proposed will be specified to be constructed to Building Regulation standards and comply with Sewers for Adoption where required. Thus,

ensuring a good quality material and workmanship, which should provide a long-term maintenance free system. Should any maintenance or replacement be required in the future, the site will under ownership of the Local Authority and will need to be included as part of their future maintenance budget.

4 Below Ground Drainage – Foul Water

- 4.1** The planned internal modifications to the building will result in some internal drainage alterations but the onsite drainage in general will remain very similar to its pre-development state. Some repairs and replacement drainage may have to be carried out where severe cracking and collapse of existing drainage systems are apparent. These are identified within the drainage condition survey report, RSP Drainage Limited 30.06.2025.
- 4.2** Existing foul water drainage systems on site will have to be diverted around the planned SuDS water feature, with new drainage installed to Building Regulation standards and comply with Sewers for Adoption where required.
- 4.3** Certain areas of foul water drainage appear to drain from adjacent properties, which may make them currently adoptable, so any drainage alterations would have to be agreed in writing with Dwr Cymru Welsh Water. We recommend further investigations are undertaken to confirm whether these drainage runs are currently live.
- 4.4** The drainage for the external Construction Skills area will be proposed to discharge to the foul water network due to the risk of contamination from these areas. All drainage channels and inspection chambers associated with this area would have to utilise sumps to effectively contain contaminants on site prior to discharge into the external sewers. The client will need to confirm whether the materials involved will require trade effluent consent from DCWW.

5 Flood Risk

- 5.1** The risk of flooding from all sources has been identified and considered below.
- 5.2** The site is located within an urban environment with terraced housing and paved highway to both north and south. Velindre Community Centre is located to the east and housing to the west.
- 5.3** The topography of the area is generally flat with only a gentle fall from east to west with the centre of the development site approximately 13.60m A.O.D.
- 5.4** The risk of river and fluvial flooding has been considered and is summarised below.
- 5.5** The site is located near the River Afan with its closest point approximately 40m southeast of the site. The Natural Resources Wales Flood and Coastal Erosion Risk Maps, show the site in a Low-Risk flood zone meaning that each

year, this area has a chance of flooding 1 in 100 (1.0%) and 1 in 1000 (0.1%).

5.6 Figure 4 below shows the relevant NRW flood risk map.

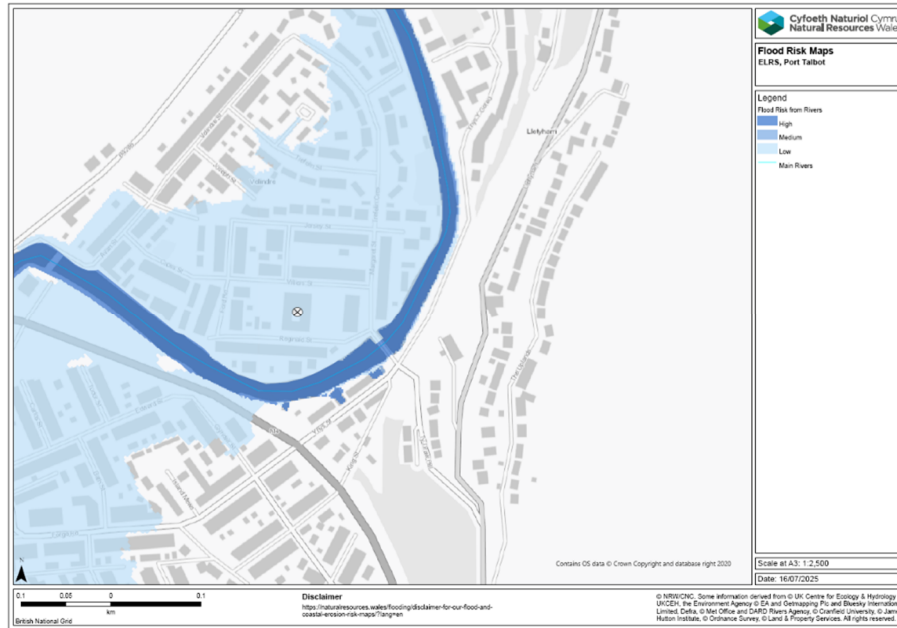


Figure 4: NRW Flood Risk Map – Rivers

5.7 Although the site is located within the Low Flood Risk area it is also in an area Benefitting from Flood Defences against Rivers, with a Standard of Protection of 100. Meaning that the flood defence protects against a 1 in 100-chance flood in any given year. This is a higher level of flood protection than a Standard of Protection of 30.

5.8 Figure 5 on the following page shows the NRW map for the flood protection area.

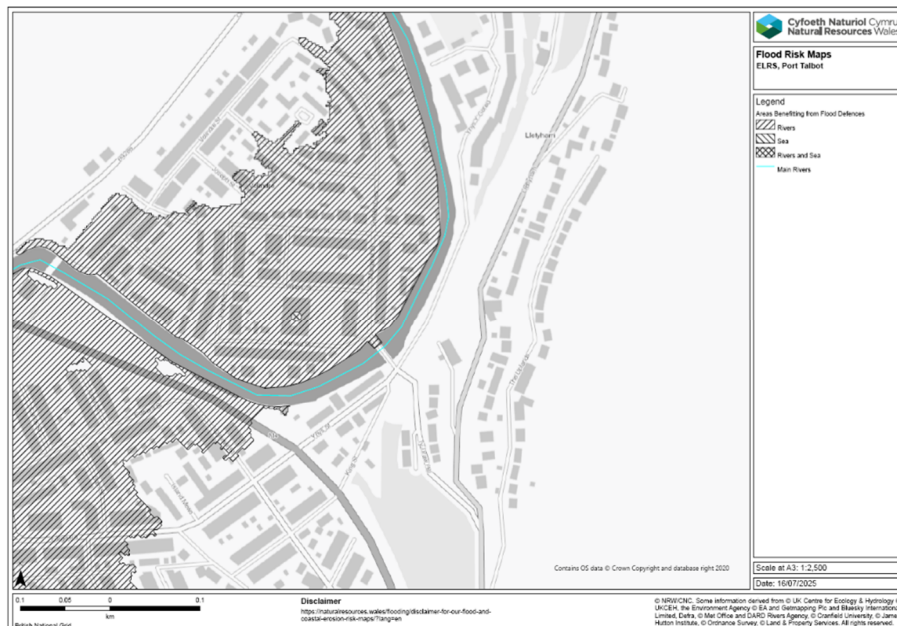


Figure 5: NRW Areas Benefitting from Flood Defence map

- 5.9** The risk of coastal flooding has been considered and is summarised below.
- 5.10** The site is located approximately 1.0km from the coastline so direct flooding from the sea can be discounted, but the nearby River Afan is tidal and affected by both tide and any upstream flooding. NRW flood risk maps show the river being at a High Risk of flooding from the sea, but it is not shown to overtop and causeway out of bank flooding in the local area.
- 5.11** Figure 6 below shows the relevant NRW flood risk map.



Figure 6: NRW Flood Risk Map – Sea

- 5.12** The risk of surface water flooding has been considered and is summarised below.
- 5.13** The site is shown to be outside of any area of surface water flooding or flooding from small watercourses. Very small areas of surface water flooding are present in what appears to be the rear and side gardens of houses, but no flooding is present within the highways around the site.
- 5.14** Figure 7 below shows the relevant NRW flood risk map.

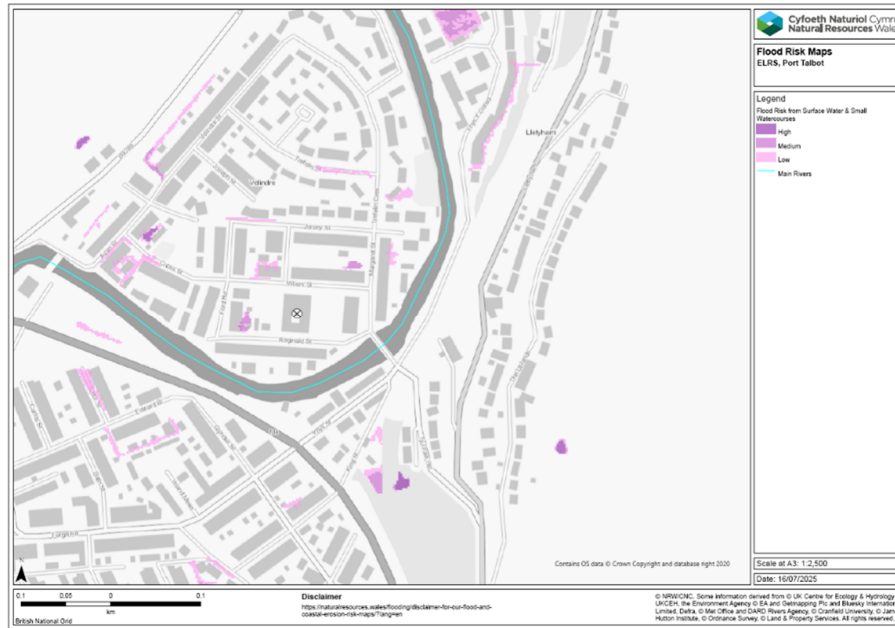


Figure 7: NRW Flood Risk Map – Surface Water

- 5.15** The risk of groundwater flooding has been considered and is summarised below.
- 5.16** In Wales, groundwater flooding is not considered as significant a problem compared to other sources of flooding like rivers, the sea, and surface water. While groundwater flooding can occur when the water table rises above ground level, it is not a primary focus of flood risk management in Wales.
- 5.17** At the time of writing the geotechnical site investigation report has not been completed so the confirmation of the presence of on-site groundwater cannot be confirmed, although it is not expected and therefore deemed low risk.
- 5.18** The risk of sewer flooding has been considered and is summarised below.
- 5.19** The only Dwr Cymru Welsh Water sewer near to the site is the combined sewer in Villiers Street. This appears to be taking discharge from both highway and domestic properties in the area, and it is assumed to be the outfall point for site drainage on the North side.
- 5.20** In urban areas sewer flooding is a result of a failure of the sewer network during times of high demand. If sewer flooding occurred in the closest manhole to site, the northwest corner of the site would be most vulnerable being slightly lower than the road level where the closest manhole is. However, flooding would occur on the highway and be contained by kerbs flowing away from site to lower levels to the west.
- 5.21** Figure 8 on the following page shows the DCWW asset plan provided marked with a green triangle showing the possible area of vulnerability from

sewer flooding.

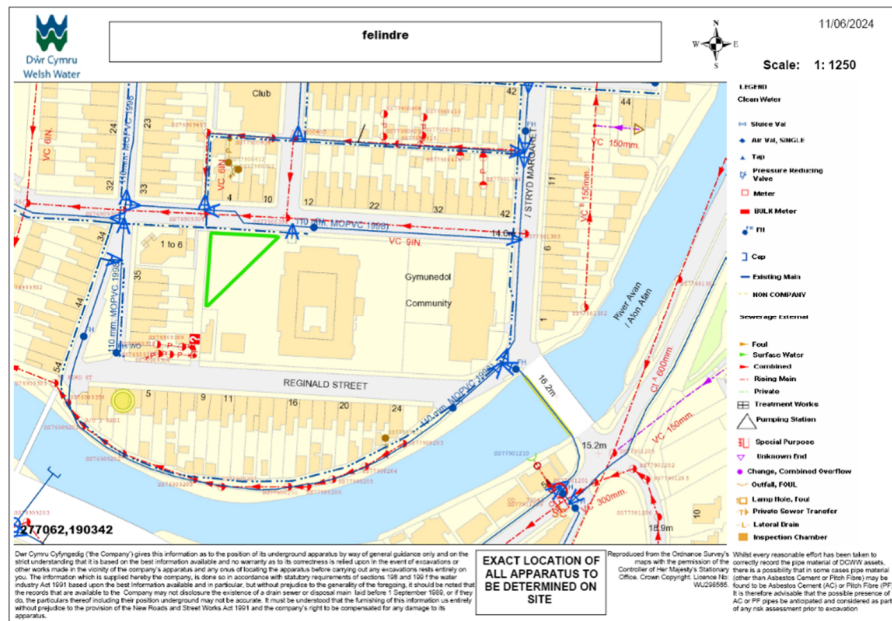


Figure 8: DCWW asset plan

- 5.22 The risk of flooding from artificial sources has been considered and is summarised below.
- 5.23 NRW flood maps show that the site is not affected by reservoir flooding. There are no large artificial bodies of water in close proximity to the site.
- 5.24 There are no historical records of flooding events in the vicinity of the site. This can be seen within **Figure 9** below.



Figure 9: NRW Historical flooding records

- 5.25 In conclusion, we have assessed the flood risk to the development from several sources.
- 5.26 The location of the site does not specifically affect the risk of flooding, with it not being located at a low point or it being at the base of a high sided valley, which would contribute to flood risk during heavy periods of high rainfall.

- 5.27** The site is located entirely in a Low Risk of flooding from the River Afan and benefitting from defences for flooding from rivers. It is deemed to be outside of areas prone to flooding from the sea, surface water and reservoirs.
- 5.28** It is assumed that ground water flooding will not be considered a risk for the site, but the full geotechnical site investigation report provides detailed information on this element.
- 5.29** As the site is brownfield in nature and the proposed development is a refit of the existing building, no significant level changes have been proposed to the development for a number of reasons.
- Increasing levels of the site would have an impact of displacing flood waters elsewhere, impacting neighbouring residential properties.
 - The existing building finished floor level is raised in the south (River Afan side) by 450mm above external levels. External access ramps are to be provided for access.
 - The site is restricted in that it is required to meet existing highway levels to allow level access for end users.

6 Flood Evacuation Plan

- 6.1 As part of planning the development requires a flood evacuation plan to be in place should the site be at increased risk of flooding from the nearby river as a consequence of severe adverse weather conditions. The below covers the required planning, preparation, monitoring and action procedures.

Flood Warnings – Planning and Preparation

- 6.2 The NRW operates a flood forecasting and warning service in areas at risk of flooding from rivers or the sea, which relies on direct measurements of rainfall, river levels, tide levels, in-house predictive models, rainfall radar data and information from the Met Office. This service operates 24 hours a day, 365 days a year.
- 6.3 If flooding is forecast, warnings are issued using a set of easily recognisable codes. A description of the codes and actions to be taken are described in section 2 of this report.
- 6.4 To ensure that the facility remains informed of flooding within the area it will be registered to the NRW's Floodline Warnings Direct Service. Registering will be the responsibility of the Principal Contractor during the construction period and the site operator (as defined by the Environmental Permit) during operation. To sign up, use the web address <https://naturalresources.wales/floodwarnings>

Monitoring Flooding Situation

- 6.5 Upon receipt of a flood alert the designated responsible person will monitor the NRW's flood warning system, contacting Floodline every hour for general update of the situation. The Floodline number is 0345 988 1188.
- 6.6 Should the NRW escalate the warning from a Flood Alert to a Flood Warning, the designated responsible person will warn site workers of the threat of flooding and evacuation will be actioned, outlined below.

Action - Evacuation Procedure

- 6.7 The designated responsible person must inform site workers of the activation of the Flood Evacuation Plan.
- 6.8 The designated responsible person will explain to site staff and site users that they must vacate the Plant.
- 6.9 Trained staff will deploy demountable flood barriers and/or sandbags around the perimeter of the Plant and critical assets, as required.
- 6.10 If flood waters have entered a building, local circuits will be isolated to minimise risk of fire or electrocution.

- 6.11** The designated responsible person announces the site/plant closure. This is followed by the sounding of the fire alarm.
- 6.12** The designated responsible person will reassure site workers that they are not in immediate danger and that the evacuation is a precaution.
- 6.13** Whilst providing reassurance the designated responsible person will direct site workers/users from the site to the identified Rendezvous Point.
- 6.14** Priority will be given to disabled site workers.
- 6.15** Site workers/users to be directed to the northern access of the site onto Villiers St and immediately directed up the unnamed road that connects Villiers Street to Jersey Street. Direct site workers/users west on Jersey Street through to Ford Road, crossing Afan/Velindre Street junction and towards the end of the unnamed cul-de-sac, the rendezvous point, which is outside all flood risk zones. This unnamed cul-de-sac has stepped and ramped access to Cwmavon main road (B4286) See Flood Evacuation Route, **Figure 10**.

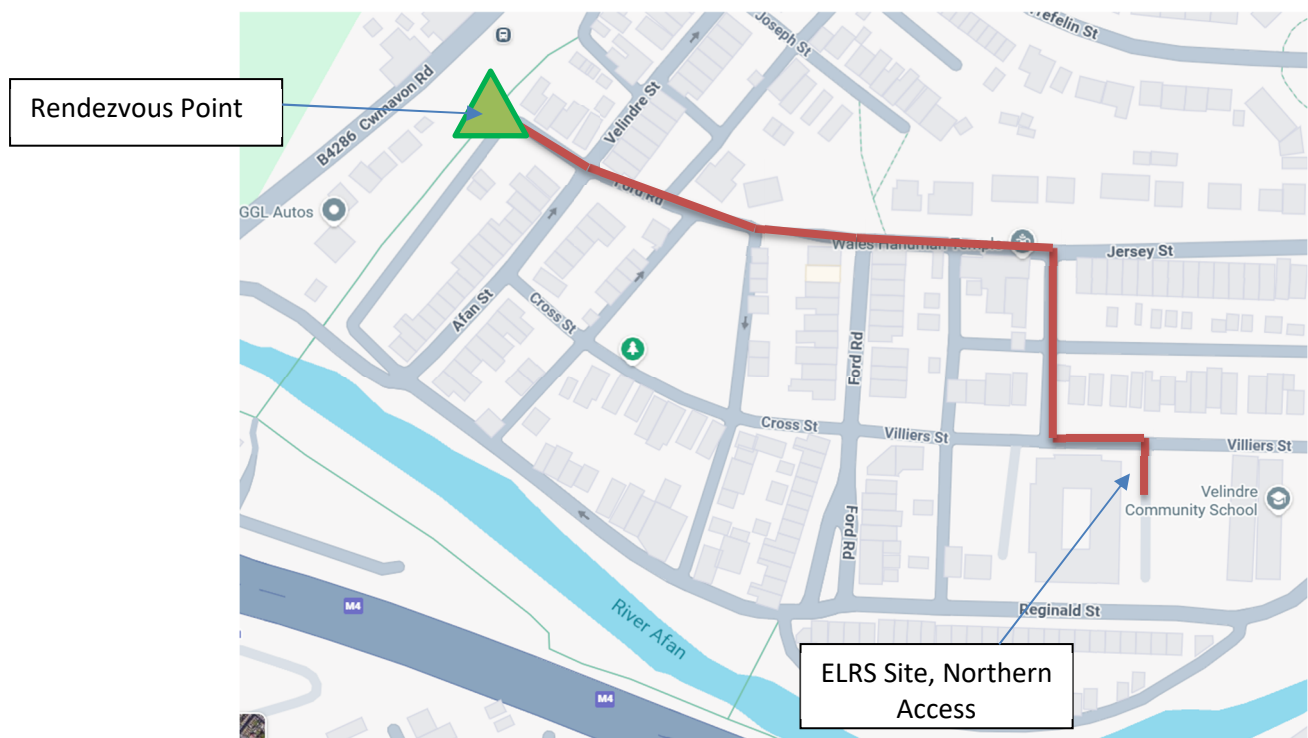


Figure 10: Flood Evacuation Route

- 6.16** The designated responsible person will then check that the site is clear.
- 6.17** Site to be securely locked.

- 6.18** The designated responsible person secures the site, then congregates with site workers at the Rendezvous Point at which point a rollcall of site staff and visitors is undertaken to ensure all are accounted for.
- 6.19** If any site worker/visitor(s) does not check in or recorded absent, a designated responsible person must be sent immediately to check on them.
- 6.20** The designated responsible person must then inform the Site Operator of the activation of the Flood Evacuation Plan.
- 6.21** All persons evacuated should remain in the vicinity of the rendezvous point until a safe transport route is identified via the B4286 to individuals' homes or suitable safe shelter.
- 6.22** The site will remain closed until the NRW gives notification that the flood warning has been removed.

Dissemination of Flood Evacuation Plan

- 6.23** The Plan is to be disseminated to the following agencies to ensure they are aware of the planned procedures.
- Neath Port Talbot Council
 - NRW
 - Local Police Force
 - Fire and Rescue Service
 - Local Ambulance Service