

Land south of Neath Road, Abergarwed - Outline Surface Water Drainage Strategy

Version 2

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Prepared for:

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1 Introduction

1.1 Terms of Reference

JBA Consulting were commissioned by ASW Scaffolding Wales to prepare an outline surface water drainage strategy for a proposed industrial unit, yarding, and associated parking at their site south of Neath Road, Abergarwed (hereafter referred to as 'the site'). The outline drainage strategy shall be used to support a planning application for the site and be submitted to the SuDS Approval Body (SAB) for pre-application consultation.

1.2 Site Description

The site is located off Neath Road in Abergarwed, as shown in Figure 1-1. The site is brownfield in nature and is currently used by ASW Scaffolding Wales for vehicle parking and storage. Several small buildings are present around the wider site and within the north of the site is a large, covered storage rack, which was recently constructed and used for the scaffolding business. The site is bound to the north by the B4242 Neath Road, agricultural land to the east, an unnamed access road to the south, and residential buildings to the west. The proposed development area (red line boundary), for which this surface water drainage strategy has been prepared is 0.0675ha.

Table 1-1 below provides a summary of the key characteristics of the site.

Table 1-1 Summary of site details

Site name	Land south of Neath Road, Abergarwed
Site area	Proposed roof area - 0.0675 ha Developable area as defined by the red line boundary as defined in Figure 1-1 - 0.0675 ha
Existing land use	Brownfield land - vehicle parking and storage used by ASW Scaffolding Wales
Proposal	Industrial building, yarding and vehicle parking
OS NGR	SN 81816 01295
SuDS Approval Body	Neath Port Talbot Council
Sewerage Undertaker	Dŵr Cymru Welsh Water

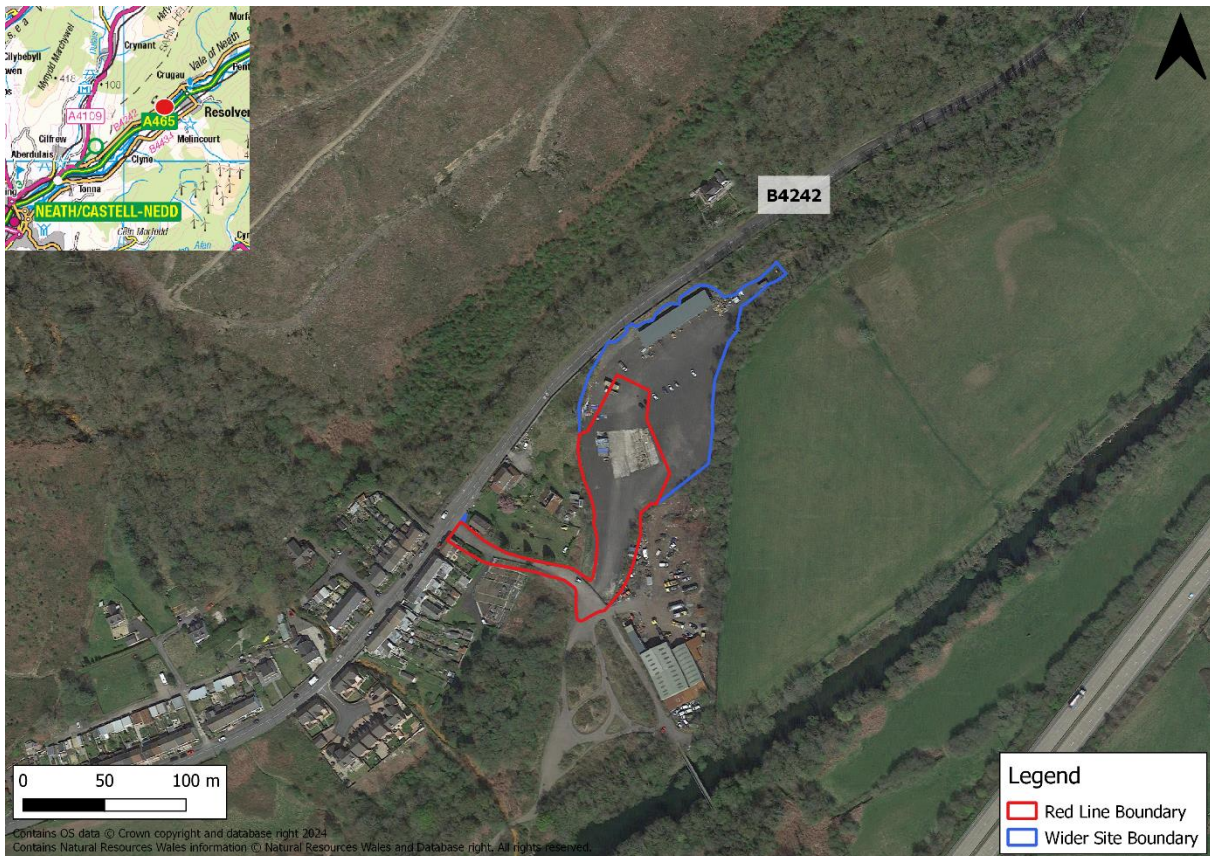


Figure 1-1 Site Location

1.3 Proposed development

The development proposals are for the construction of an industrial building and associated yarding and vehicle parking. A masterplan for the proposed development is contained in Appendix A.

The associated yarding and vehicle parking shall be located on an existing hardstanding area made of concrete and will drain as existing. Therefore, this surface water drainage strategy has been developed for the proposed industrial building only.

1.4 Existing site topography

A topographic survey of the site was undertaken by Alpine Land Surveyors Ltd in August 2019 and is provided in Appendix B. Natural Resources Wales (NRW) open source 1m Light Detection and ranging (LiDAR), which provides an alternative illustration of the site topography, is shown in Figure 1-2.

Ground levels across the main part of the site are predominantly between approximately 21.49mAOD in the south-east, rising to approximately 22.84mAOD in the north. The site access off of Neath Road is at an elevation of approximately 29.31mAOD and decreases to approximately 21.96mAOD to the location of the main site entrance.



Figure 1-2 DTM 1m LiDAR

1.5 Site geology and hydrogeology

The British Geological Society (BGS) GeoIndex¹ indicates that the proposed development site is underlain by South Wales Upper Coal Measures Formation comprised of mudstone, siltstone, and sandstone. The superficial geology comprises Alluvium containing clay, silt, sand, and gravel.

The soils on site have been assessed on the Cranfield University Soilscape viewer² and are described as loamy and clayey floodplain soils with naturally high groundwater.

1.6 Watercourses

The site is located near a number of NRW Main Rivers and Ordinary Watercourses as shown in Figure 1-3.

An unnamed Ordinary Watercourse is located within close proximity to the eastern boundary and is believed to discharge into the River Neath to the south of the site.

The Neath Canal flows in a southerly direction in open channel before being culverted at the north-eastern site boundary and flowing beneath the site.

¹ <https://mapapps2.bgs.ac.uk/geoindex/home.html>

² <https://www.landis.org.uk/soilscales/>

The Garwed Brook flows in a southerly direction 130m south of the site before reaching its confluence with the River Neath 170m south of the site.

The River Neath, an NRW Main River, flows in a south-westerly direction approximately 110m to the south-east of the site.

The site is not protected by the presence of any formal flood defences.

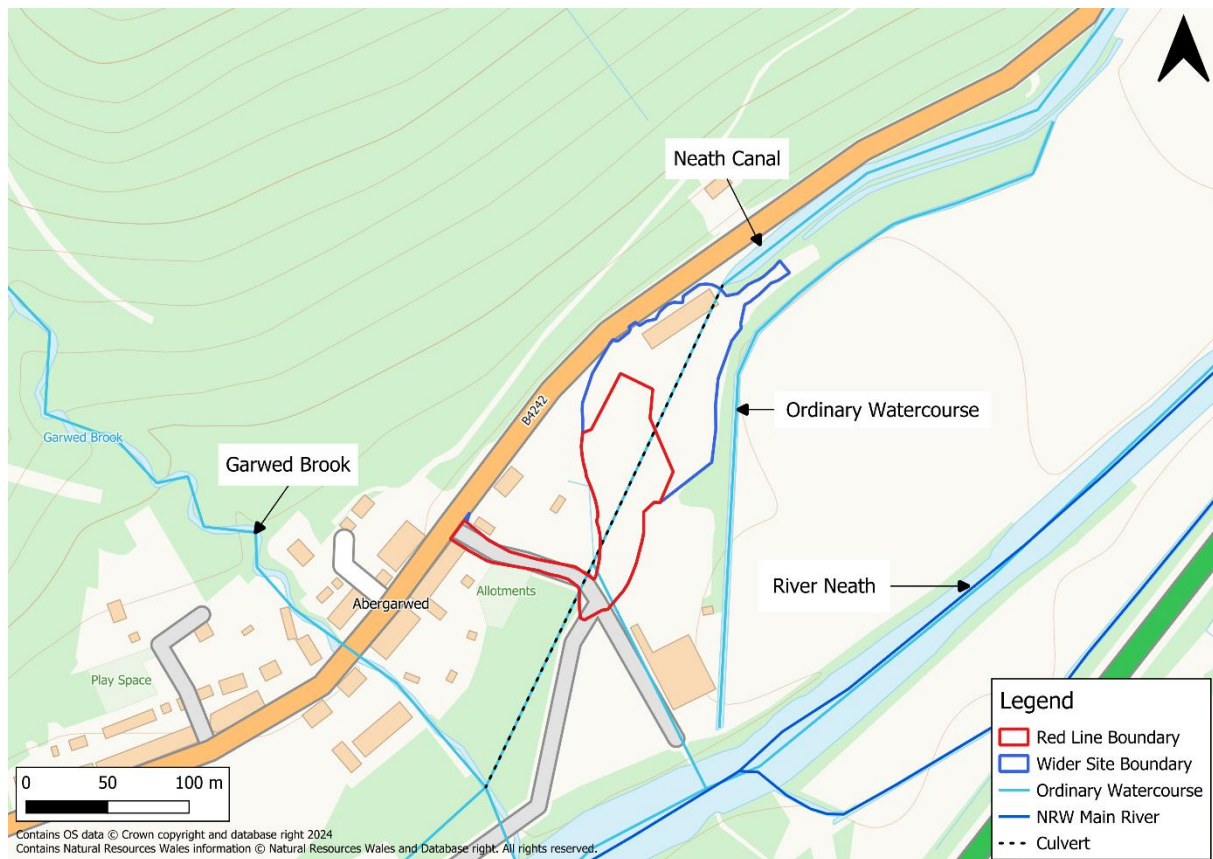


Figure 1-3 Nearby Watercourses

1.7 Summary of Surface Water Flood Risk

Surface water flooding occurs when rain falling on saturated grounds flow overland, following the local topography. Surface water flooding and subsequent overland flow can therefore pose a risk to both the development site and surrounding land. The overland flow may originate from the site itself or adjoining land at a higher elevation from which flow migrates onto the development.

The Natural Resources Wales (NRW) flood map for surface water and small watercourses, as shown in Figure 1-4, identifies the site as being at very low risk of surface water flooding. This means that there is a less than 0.1% AEP (1 in 1000) chance of flooding from rainfall in any given year.

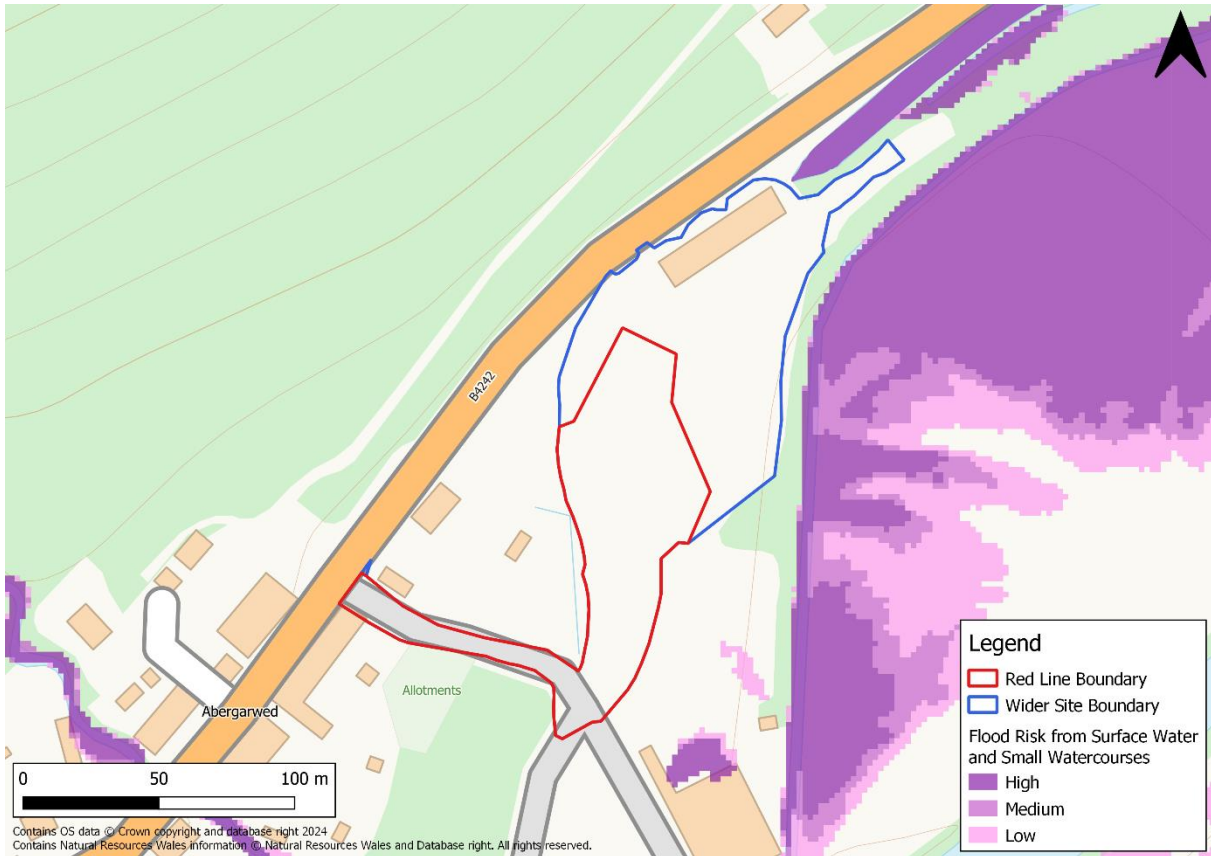


Figure 1-4 FRAW - Flood Risk from Surface Water and Small Watercourses

1.8 Summary of Fluvial Flood Risk

NRW's Flood Risk Assessment Wales (FRAW) flood risk from rivers mapping, as shown in Figure 1-5, indicates that part of the site is at low risk, which indicates between a 0.1% - 1% AEP chance of flooding from this source. However, it should be noted that the FRAW

mapping does not include an allowance for climate change which should be considered to fully assess flood risk at the site for its lifetime.



Figure 1-5 FRAW - Flood Risk from Rivers

Figure 1-6 below displays the Flood Map for Planning (FMfP) flood risk from rivers mapping. The Flood Map for Planning is used to trigger different planning actions in support of the forthcoming update to TAN-15. Although the new FMfP is not a material consideration, the new FMfP is useful in that it shows the flood risk allowing for climate change over an assumed 100-year lifetime of development. It should be noted that the industrial nature of the proposed development applies a 75-year lifetime of development and therefore the FMfP is precautionary.

The site is predominantly shown to be located within Flood Zones 2 and 3 of the FMfP for Rivers. The proposed building location is within Flood Zone 2, which represents areas that have between a 0.1% - 1% AEP chance of flooding in any given year, including climate change.

Flood Zone 3 represents areas which have a greater than 1% AEP chance of flooding in a given year, including an allowance for climate change.



Figure 1-6 FMfP - Flood Risk from Rivers

2 Surface Water Drainage Strategy

2.1 Existing Surface Water Regime

Given the underlying geology and assumed soil type, along with being unaware of any existing surface water drainage infrastructure across the site, it is assumed that currently surface water drainage via evapo-transpiration losses, slow infiltration into the underlying soils, and runoff towards the Ordinary Watercourse to the east and ultimately the River Neath to the south of the site.

2.2 Greenfield Runoff Rates

Greenfield runoff rates and volumes have been calculated which will form a key design criterion for the development of a surface water drainage system across the site.

Tabel 24.1 of Ciria C753 The SuDS Manual indicates that FEH methods (FEH Statistical and ReFH2) should be the preferred method for calculating peak greenfield runoff rates. This is supported by Natural Resources Wales GN008: Flood Estimation: Technical Guidance and Environment Agency research by Faulkner et al which concluded that the FEH methods are applicable across a range of catchment sizes and that they should be used in place of outdated methods such as IH124 and ADAS 345 where possible.

The UK SuDS Tool was used to calculate the greenfield runoff rates for the proposed roof area. As the minimum area accepted within the UK SuDS Tool is 0.1ha, this is the area used to represent the site. Catchment descriptors for the local catchment (SAAR and BFIHOST) were extracted from the FEH Web service. The calculated greenfield runoff rates are shown in Table 2-1 below and the UK SuDS calculation record is included in Appendix C.

Table 2-1 Greenfield Runoff Rates

Return Period	Specific Runoff (l/s/ha)	Peak Runoff Rate (l/s)
1	24.4	2.44
QBAR	27.7	2.77
30	49.3	4.93
100	60.3	6.03

2.3 Greenfield Runoff Volumes

Runoff volumes for the wider site area were also calculated for the six-hour storm event using the FSSR16 method as shown in Equation 1 below.

Equation 1:

Runoff Volume = Site Area x Rainfall Depth x Percentage Runoff

The rainfall depths for a six-hour 100-year storm event were extracted from the FEH Web Service and are summarised in Table 2-2 with the calculated Greenfield Runoff Volumes.

Table 2-2 Greenfield Runoff Volumes

Return Period	6-hour rainfall runoff depth (mm)	Site Runoff Volume (m ³)
30	62.2	22
100	73.9	27
100 +40% CC	103.4	40

3 Surface Water Management Approach

3.1 Surface Water Drainage Proposal

An outline surface water drainage proposal for the site has been developed which will manage surface water runoff without increasing flood risk to other developments or impacting on water quality downstream. The development of the drainage strategy is via a number of steps where the drainage objectives and options for SuDS features are determined. Further detailed design of the drainage system will be determined once an agreement in principle has been received from the SuDS Approval Body (SAB).

The outline strategy discusses each SuDS standard in turn and details the way in which the proposed surface water drainage strategy will comply with each standard.

3.2 Sustainable Drainage Systems

Sustainable Drainage Systems (SuDS) aim to mimic the natural processes of surface water drainage by allowing water to flow along the natural flow routes ensuring that runoff rates and volumes during storm events are not increased above greenfield values. SuDS also aim to provide water treatment, biodiversity, and amenity benefits within Blue and Green corridors.

Schedule 3 of the Flood and Water Management Act 2010 was enacted in Wales in January 2019, leading to the requirements for all new developments to incorporate the four pillars of SuDS design, shown in Figure 3-1.

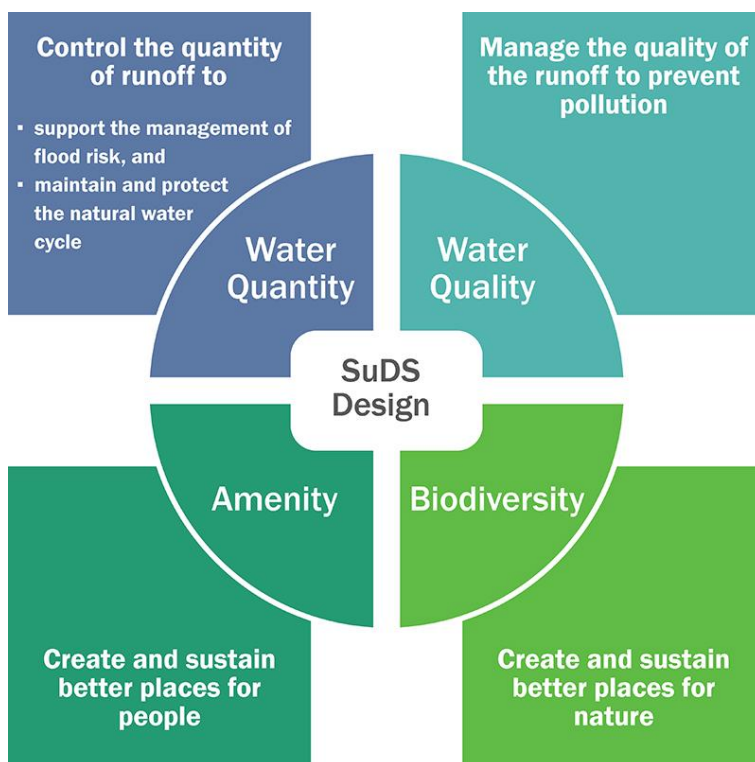


Figure 3-1 The Four Pillars of SuDS Design (Ciria SuDS Manual)

3.2.1 Design Criteria

A drainage strategy outlining the means of surface water management at the proposed development site has been produced in line with the latest guidance and design standards including:

- C753 The SuDS Manual (Ciria 2015)
- Statutory standards for sustainable drainage systems - designing, constructing, operating and maintaining surface water drainage systems (Welsh Government 2018)
- Rainfall Runoff Management for Developments - SC030219 (Environment Agency 2013)
- Planning Policy Wales (Edition 9, November 2016)
- The Building Regulations 2010: Part H: Drainage and Waste Disposal

In line with Sustainable Drainage Systems Standards for Wales (2018), surface water runoff events up to the 1% AEP (1 in 100 year) return period event should be managed to protect people and property on and adjacent to the site from flooding from the drainage system.

The Welsh SuDS Standards state that attenuation storage should be utilised to limit discharge runoff from the site with surface storage features used in preference to underground systems as they are considered more adaptable.

Neath Port Talbot does not have any specific guidance related to SuDS. Should guidance be developed prior to or during the detailed design stage, it should also be consulted to inform the drainage strategy.

3.3 Principles of SuDS

The proposed drainage strategy will use discharge to a surface water body as the main discharge method, employing a series of SuDS assets into the network. The proposed outline strategy is contained in Appendix D.

The proposed surface water drainage strategy complies with the standard principles of SuDS in the following way:

- Wherever possible across the site water is managed as close to the surface as possible. Water is conveyed across parts of the site via rain gardens and a dry swale.
- Rainwater is treated as a valuable natural resource across the site by keeping water as close to the surface as possible through the use of rain gardens and dry swale. SuDS assets will provide amenity and biodiversity benefits across the site.
- Across the site, rainfall shall be managed to help protect people from increased flood risk through the implementation of source control techniques such as rain gardens.
- Rainfall will be managed across the site to ensure that no surface water leaves the site during the 1 in 100-year event plus 40% climate change, and proposed buildings remain flood free.

- A 10% allowance for urban creep has not been applied to this surface water drainage scheme. The industrial nature of the development does not pose itself for future expansion without detailed consideration of the drainage implications.
- A SuDS Management Train is included across the site. Water falling on the roof of the building will flow into rain gardens around the perimeter of the building. Rainwater will be discharged via a hydrobrake at a controlled flow rate of 2l/s to a dry swale which is proposed in order to meet interception compliance, rather than for attenuation purposes, and then into the Ordinary Watercourse located to the east of the site.
- The Simple Index Approach, C753, will be used to demonstrate how surface water shall be managed to ensure that the proposed development site shall not have a detrimental effect on water quality.
- Biodiversity and amenity benefits are maximised across the site wherever possible. The use of rain gardens and the dry swale increases the opportunities for habitat creation and aids to promote a sense of wellbeing for employees. A detailed Amenity and Biodiversity Plan will need to be produced at detailed design stage.
- To make the best use of available land by working with the existing topography of the site and placing SuDS features in green areas of the proposed design, enhancing the environment and providing multi-functional areas of open space.
- To ensure that the scheme performs reliably and effectively for the lifetime of the development, a maintenance plan shall be produced during detailed design stage which shall detail the management and maintenance requirements of the system to ensure it functions to its optimal capacity in perpetuity.
- During detailed design stage, further information shall be provided on the affordability in terms of long-term maintenance costs through the provision of a SuDS maintenance plan. The environmental and social benefits of the scheme are detailed in Sections 3.7 and 3.8.

3.4 S1: Surface Water Runoff Destination

The statutory standards for SuDS in Wales address the use of surface water by the development and where it should be discharged. Standard S1 describes a destination hierarchy which sets out the preferred routes for discharge of runoff from the site:

- Priority Level 1: surface water runoff is collected for reuse
- Priority Level 2: surface water is infiltrated into the ground
- Priority Level 3: surface water runoff is discharged into a surface water body
- Priority Level 4: surface water runoff is discharged to a surface water sewer; highway drain or other drainage system
- Priority Level 5: surface water runoff is discharge to a combined sewer

Priority Level 1 is the preferred (highest) priority and 4 and 5 should only be used in exceptional circumstances. The following outlines how the proposed development adheres to the drainage hierarchy.

3.4.1 Priority Level 1 - Water for reuse

The potential for surface water reuse within the proposed development is likely to be limited due to low demand and would not provide a viable means for the disposal of all surface water for the site.

3.4.2 Priority Level 2 - Infiltration

Based on current information about underlying geology it is considered that the potential for infiltration across the site is likely to be minimal. Infiltration testing in accordance with BRE365 shall be required prior to detailed design.

For the purpose of this report, it is assumed that infiltration is not viable.

3.4.3 Priority Level 3 - Discharge to surface water body

There is a culverted Ordinary Watercourse which flows through the south, and ultimately discharges into the River Neath to the south-east of the site. The culvert is initially deemed to be accessible from the south of the site near the entrance, and it is therefore proposed to discharge of surface water at this location. Further investigation shall be required prior to detailed design to confirm that this is a feasible discharge method.

As a suitable discharge location has been found, Priority Levels 4 and 5 do not need to be considered further.

3.5 S2: Surface Water Runoff Hydraulic Control: Proposed Discharge Rate

There are typically three design storm events which should be considered when designing the SuDS system for managing flows and volumes:

- 1 in 1-year event, on sloping sites without basements, where surcharging above soffits of any surface water drainage pipework is not permitted.
- 1 in 30-year storm event, where surface water flooding of the site does not occur at this frequency.
- 1 in 100-year storm event with allowances for future climate change, where runoff from the site should be controlled to the greenfield rate using SuDS attenuation features to manage flows and volumes within the extents of the development site.

3.5.1 Climate Change impact

A climate change allowance of 40% has been used in line with the upper estimates for the 75-year design life of the development.

3.5.2 Attenuation Storage

InfoDrainage was used to create a 1D representation of the proposed development and calculate the required storage volume for the proposed development for the 1 in 100-year event plus 40% to account for climate change.

Catchment descriptors were extracted from the Flood Estimation Handbook webservice. The FEH22 rainfall has been utilised for the 6 hour 100-year rainfall event.

The soil characteristics of the area are not ideal for infiltration. The CIRIA manual states ***"All the runoff from the site for the 1:100-year event should be discharged at either a rate of 2 l/s/ha or the average annual peak flow rate (i.e. the mean annual flood, QBAR), whichever is the greater."*** This method has been adopted for sizing of the storage volume required.

The developable area is considered as all impermeable areas across the development site. Therefore, the impermeable area is 100% of the developable area. A 10% urban creep allowance has not been applied as further consideration of drainage implications will be required before further expansion would be permitted. A 40% rainfall intensity climate change uplift has been applied.

Table 3-1 summarises the user defined variables input into the estimation tool.

Table 3-1 User defined values

Variable	Value
Site area	0.0675 ha (roof area)
Developable area	0.0675 ha
Impermeable area	0.0675 ha
Climate change allowance	40%
Urban creep allowance	0%
BFI HOST	0.344
SPR HOST	1982
Volume control approach	Flow control to a max of 2 l/s/ha or QBAR.

Using InfoDrainage, it has been calculated that 78m³ of storage is required for the site. A summary of the model is contained in Appendix E.

The outline drainage strategy, demonstrating how this attenuation volume is provided across the site is shown in Appendix D.

It is proposed that rainwater landing on the roof will drain into rain gardens located around the perimeter of the building. Surface water will then be discharged using a hydrobrake, at a restricted rate of 2 l/s, into a piped system which conveys water to a feature with similar characteristics to a dry swale. This will be a shallow, and gently sloping, vegetated channel, which will convey surface water and provide interception compliance. Surface water shall then be discharged into the culverted ordinary watercourse in the south of the site.

3.5.3 SuDS in the Floodplain

The statutory standards for SuDS in Wales indicate that SuDS should not be located within the functional floodplain by virtue of the need for attenuation volume provision during a flood event.

In line with Chapter 8 of Ciria C753 The SuDS Manual, it is considered that the presence of the floodplain should not preclude the site from including SuDS, as they could be effective in managing routine rainfall, and runoff needs to be discharged safely across the floodplain. SuDS.

Consequently, rain gardens which provide sufficient attenuation for the development proposals, will be located outside of Flood Zone 3 of the Flood Map for Planning, as shown in the proposed drainage strategy contained in Appendix D. It should be noted that the dry swale feature does not provide attenuation for the site, and has been proposed for water quality, amenity and biodiversity benefits. Therefore, it is deemed appropriate for this feature to encroach into the Flood Zone to the east of the site.

3.5.4 Exceedance Events

Extreme events exceeding the design event or internal drainage blockages / failures could occur and result in overland flows across the site. The duration of flooding, maximum depths, velocity, and route of flood flows should be established and managed. The impact of exceedance flows onto adjacent land should also be considered - the return period of this assessment will be related to the potential consequences associated with the impact, and further guidance is requested from the SAB.

It is envisaged that exceedance flows from the proposed development shall flow south-easterly across the yarding area towards the swale feature in along the eastern boundary of the development site. A preliminary exceedance flow route diagram is contained in Appendix D.

3.5.5 Interception of rainfall

When rainfall takes place on greenfield sites there is, for the majority of rainfall events, no runoff due to evapotranspiration or groundwater recharge. Therefore, interception mechanisms are based on runoff volume reduction using evapotranspiration and infiltration processes. Table G2.1 of the statutory standards for SuDS in Wales lists the interception drainage components which have assumed compliance. Rain gardens and the dry swale proposed for the site are deemed compliant as interception mechanisms as detailed in the following paragraphs.

Rain gardens will need to be lined if they are within 5m of the building, to protect its structural integrity. Lined rain gardens within the site act in the same form as a green roof, providing that sufficient planting and soil volume is provided. In accordance with the standards, all surfaces that have green roofs are deemed to comply.

The dry swale feature has been proposed to contribute towards interception compliance at the site. Where the longitudinal gradient of the swale is less than 1:100, they are suitable for interception delivery for impermeable surface areas up to 5 times the base of the vegetated surface area receiving runoff.

3.6 S3: Water Quality

The surface water drainage system should provide a sufficient level of water quality treatment to prevent pollution of receiving waterbodies. During the water treatment design events (5mm rainfall across the entire site) no runoff should leave the site. This is usually achieved through source control techniques such as permeable pavements and rain gardens.

Table 4.3 of the SuDS Manual advocates the use of the 'simple index approach' to determine an appropriate level of pollution mitigation for such sites. This splits pollution into three contaminant types (Total Suspended Solids, Metals, and Hydrocarbons) and assigns a 'pollution hazard index' to each type. When more than one SuDS component is required a multiplication factor of 0.5 is applied to mitigation indices for secondary and tertiary components to account for reduced performance.

As the proposed development is for an industrial roof, it is defined as having a Low Pollution Hazard Level in line with Table G3.1 of the Statutory Standards for SuDS in Wales.

The 'pollution hazard indices' for a low pollution site are given in Table 3-2 below.

Table 3-2 Pollution hazard indices

Total Suspended Solids	Metals	Hydrocarbons
0.3	0.2	0.05

Table 26.4 of the SuDS Manual provides indicative SuDS mitigation indices for discharges to surface water. Table 3-3 provides the indicative SuDS mitigation indices for the proposed SuDS features for the site. It is demonstrated that the strategy is deemed to comply with the water quality requirements of the SuDS standards as the mitigation indices are greater than or equal to the 'pollution hazard index'.

Table 3-3 SuDS Mitigation Indices

SuDS Component	Total Suspended Solids	Metals	Hydrocarbons
Rain Garden (Bioretention system)	0.8	0.8	0.8
Swale	0.5	0.6	0.6

3.7 S4: Amenity Value

The design of the surface water management system should maximise amenity benefit across the site. SuDS components should enhance the provision of high-quality, attractive public space which can help to provide health and wellbeing benefits, improve liveability for local communities and can contribute to improving climate resilience of new developments.

The aim of Standard 4 (S4) is to ensure that wherever possible and having regard to the need to prioritise infiltration drainage, the SuDS scheme makes the best contribution towards maximising benefits for amenity.

Across the development site, SuDS are utilised to promote the amenity benefit of the scheme. The proposed rain gardens will contribute to the health and wellbeing of employees, along with improving the site's climate resilience. The dry swale along the eastern boundary of the wider site will also contribute to the amenity of the site.

3.8 S5: Biodiversity

The surface water drainage system should seek to enhance existing habitats within the site and complement neighbouring habitats. The ecological potential of the SuDS system can be maximised by utilising local planting and locating SuDS adjacent to existing features. The strategy should create a range of habitats which should be sustained by ensuring that an effective management regime is implemented.

Vegetated SuDS are proposed for the development site in the form of rain gardens and a dry swale. It is proposed that the rain gardens will be vegetated using planting of known wildlife value that are appropriate to the location. Native plants and grasses will be used where possible that are appropriate to the region and suited to the local soils and hydrology. The use of invasive species will be avoided.

The detailed design phase of the proposed surface water drainage strategy will provide further information on the proposed ecological enhancement to be provided across the site.

3.9 S6: Design for Construction, Maintenance, and Structural Integrity

The national SuDS standards state that components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development, taking into account the requirement for reasonable levels of maintenance. The detailed design will include a maintenance plan and associated costs for the development site.

3.9.1 Health and Safety

Under the Construction (Design and Management) Regulations 2015 (CDM 2015) it is the designer's duty to:

- Eliminate foreseeable health and safety risks to anyone affected by the project
- Take steps to reduce or control any risks that cannot be eliminated
- Communicate, cooperate, and coordinate with the client, other designers and contractors involved in the project so that designs are compatible, and health and safety risks are accounted for during the project and beyond.

The potential significant hazards and risks associated with the construction, operation, and maintenance of the proposed surface water drainage system have been identified during the design process. The information on the identified hazards and potential mitigation

measures of the risks presented by the hazards is summarised in the "Designer's Risk Assessment" included in Appendix F.

It should be noted that the document identified only significant hazards and risk within and in the immediate vicinity of the site based on a desk-based assessment of available information. The list therefore should not be considered as exhaustive, and a detailed site survey should be undertaken prior to commencing any construction activities on site. a further detailed CDM risk assessment should be undertaken during the detailed design stage, when the development proposals are finalised.

3.9.2 Adoption and Maintenance

Schedule 3 of the Flood and Water Management Act was implemented in Wales on the 7th January 2019. Under this legislation, SuDS that serve multiple properties must be approved and adopted by the SuDS Approval Body (SAB) - a function performed by the Lead Local Flood Authority at Neath Port Talbot Couty Council. Any SuDS that serve a single curtilage will not typically be adopted by the SAB. Therefore, it is unlikely that any SuDS on the proposed development site will be offered for adoption.

3.9.3 Construction Phase

The surface water runoff will need to be managed during the construction stage of the development to minimise the risk of flooding and pollution to the surrounding environment. This will be addressed within a Construction Environmental Management Plan prepared for the development by an appointed contractor for the work prior to construction commencing. This shall be submitted to the SAB at detailed design stage.

4 Foul Drainage

4.1 Building regulations 2010: Part H: Drainage and Waste Disposal

Part H of the Building Regulations 2010 states that foul drainage should be connected to the foul or combined sewer wherever this is reasonably practical.

4.2 Dŵr Cymru Welsh Water Developer Enquiry

A pre-planning consultation request has been submitted to Dŵr Cymru Welsh Water (DCWW) to determine if there is sufficient capacity within the existing public sewerage network. A plan of the foul sewerage network is shown in Appendix G.

DCWW advise that foul flows generated by the proposed development can be accommodated within the public sewerage system with a suggested point of connection just south of the unnamed road off of Neath Road, to the south-west of the site. This will require a pumped system.

Preliminary calculations indicate that a Type 1 pumped system would be appropriate to serve the development site due its small nature. As such, foul drainage will be able to flow via a piped network by gravity from the proposed building in a southerly direction towards the site entrance. However, a pumping system will then be required from the site to the DCWW public sewerage system, via a piped network along the unnamed road. An indicative network for foul drainage has been included in Appendix D, although this shall be confirmed prior to detailed design. Preceding detailed design, further consideration will need to be given towards the existing culvert associated with the Neath Canal that crosses through the site, and how the pathway of the foul drainage network may be constrained by its presence.

No problems are envisaged with the Waste Water Treatment Works for the treatment of domestic discharges from this site.

5 Conclusions and recommendations

JBA Consulting were commissioned by ASW Scaffolding Wales to prepare an outline surface water drainage strategy for a proposed industrial unit, yarding, and associated parking at their site south of Neath Road, Abergarwed.

The existing site is brownfield in nature and is currently used by ASW Scaffolding Wales for vehicle parking and storage. Several small buildings are present around the wider ownership boundary and within the north of the site is a large, covered storage rack, which was recently constructed and used for the scaffolding business.

The proposed development is for the construction of an industrial building and associated yarding and vehicle parking. As the associated yarding and vehicle parking shall be located on an existing hardstanding area made of concrete and will drain as existing, this surface water drainage strategy has been developed for the proposed industrial building only.

The site slopes in a general south-easterly direction with ground levels lowest in the south-east at approximately 21.49mAOD. Ground levels are highest in the north at approximately 22.84mAOD. The site access off of Neath Road is at an elevation of approximately 29.31mAOD and decreases to approximately 21.96mAOD to the location of the main site entrance.

There are a number of Ordinary Watercourses that flow near to the site, along with the River Neath, and NRW Main River which flows to the south of the site. An Ordinary Watercourse is culverted under the southern part of the site, which ultimately discharges into the River Neath. It is proposed to make a connection into the culvert to discharge of surface water from the site. Further investigation to confirm a viable connection shall be required prior to detailed design.

Greenfield runoff rates for the site have been calculated as 2.7 l/s.

It has been calculated that approximately 78m³ of attenuation will be required for the 1 in 100 year +40% climate change event.

It is proposed that water falling on the roof will be conveyed via the downpipes into rain gardens located around the perimeter of the building. Surface water will then be discharged from the rain gardens to a dry swale feature via surface water pipes, at a restricted rate of 2 l/s. Surface water will be conveyed through the dry swale feature, which has been proposed for water quality benefits, before being discharged into the culverted Ordinary Watercourse to the south of the site.

The proposed SuDS assets shall provide sufficient water quality, amenity and biodiversity benefits.

A DCWW developer enquiry has been submitted as part of this study. DCWW advise that foul flows can be accommodated within the public network. A Type 1 pumping station is deemed to be appropriate for the site, and is required in order to reach the proposed

connection to the public sewerage system along the unnamed road off of Neath Road, to the south west of the site.

A Development Proposal

B Topographic Survey

C Greenfield Runoff Rates

D Outline Surface Water Drainage Strategy

E InfoDrainage Attenuation Calculations

F Designer's Risk Assessment

G DCWW Developer Enquiry

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