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ENVIRONMENTAL ASSESSMENT

Flood Consequence Assessment (FCA) and Surface Water Drainage Strategy (SWDS) Addendum

Land West of Ashleigh Terrace,
Jersey Marine,
Swansea,
SA10 6JL

Document Issue Record

Project: Phase 1 Flood Consequence Assessment (FCA) and Surface Water Drainage Strategy (SWDS)

Prepared for: SGW Planning on behalf of A2Z of Motoring

Reference: 5087

Site Location: Land West of Ashleigh Terrace, Jersey Marine, Swansea, SA10 6JL

Proposed Development: It is understood that the development is for the construction of a light industrial site with a range of units for light engineering.

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1. Summary

- 1.1 This document presents an addendum relating to water quality and treatment to support the findings of a Flood Consequence Assessment (FCA) and Surface Water Drainage Strategy (SWDS) that has been undertaken for the proposed development on land west of Ashleigh Terrace, Jersey Marine, Swansea, SA10 6JL.
- 1.2 The existing site is vacant. The proposed development is for the construction of a light industrial site with a range of units for light engineering. It is understood that a range of light industrial units will be constructed as part of the proposed development.
- 1.3 According to low detail, national-scale flood mapping created on behalf of Natural Resources Wales (NRW), The Welsh Government's Development Advice Maps (DAMS), referred to in TAN15, shows the site to lie within Flood Zone C2 (areas without significant flood defence infrastructure) and Flood Zone A (considered to be at little or no risk of fluvial or coastal/tidal flooding). Plans provided by the client indicate that all built footprint will be concentrated to Flood Zone A.
- 1.4 In accordance with the Technical Advice Note 15: Development and Flood risk standing advice on development and flood risk, the proposed development (industrial use) would be considered "Less Vulnerable" under TAN15.
- 1.5 Topographic levels vary between approximately 7.49mAOD and 9.88mAOD across the site (Source: *Topographic Survey provided by the client, Alpine Land Surveyors*).
- 1.6 Water treatment can be provided through incorporation of SuDS, or proprietary methods, as required to meet the final usage defined for the site.
- 1.7 As outlined within Section 3 of this report, the installation of permeable paving, which in turn would discharge into a pond in the east of the site, would provide sufficient treatment to manage the potential water quality issues on site (in accordance with the Ciria SuDS Manual).
- 1.8 As such, and given that:
 - a) the development is for the extension of a light industrial site and is classified as 'Less Vulnerable' in accordance with TAN 15;
 - b) all built developments will be sequentially located to Flood Zone A (little or no flood risk from fluvial/tidal sources);
 - c) betterment can be provided by the formalisation of a flood warning and evacuation plan;
 - d) runoff will be limited to Qbar at 9.6l/s;
 - e) storage will be provided to accommodate the 1 in 100 year rainfall event including climate change;
 - f) adequate water quality treatment can be incorporated in line with the Ciria SuDS Manual,following the guidelines contained within the TAN15 and 'Recommended non-statutory standards for sustainable drainage (SuDS) in Wales 2017', the proposed development is considered **to be suitable** assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Development Description	Existing	Proposed
Development Type:	Vacant	Construction of a range of light industrial units
Number of Bedrooms:	N/A ¹	N/A ¹
EA Vulnerability Classification:	Less Vulnerable	Less Vulnerable
Ground Floor Level:	N/A ¹	Ground floor levels to be set no lower than existing topographic levels
Level of Sleeping Accommodation:	N/A ¹	N/A ¹
Impermeable Surface Area:	N/A ¹	Presumed increase
Surface Water Drainage:	N/A ¹	Surface Water Drainage Strategy undertaken
Site Size:	N/A ²	No change
Risk to Development	Summary	Comment
NRW Flood Zone:	A, C2	Built footprint to be sequentially located to Flood Zone A
Flood Source:	Fluvial	Tennant Canal
1:100 Year Flood Level	N/A ²	No site-specific data held by NRW at time of writing. Built footprint sequentially located to Flood Zone A.
1:100 Year Flood Level & Climate Change	N/A ²	
1:1000 Year Flood Level	N/A ²	
Recorded Flood Events in Area:	Yes	
Recorded Flood Events at Site:	No	1912, 1927, 1960 and 1970
SFCA Available:	Yes	Neath Port Talbot County Borough Council SFCA (2014)
Management Measures	Summary	Comment
Ground floor level above extreme flood levels:	N/A ¹	
Safe Access/Egress Route:	Yes	Safe access away from the source of flooding
Flood Resilient Design:	N/A ¹	
Site Drainage Plan:	N/A ¹	Surface Water Drainage Strategy undertaken
Flood Warning & Evacuation Plan:	Yes	NRW Flood Warning Service
Offsite Impacts	Summary	Comment
Displacement of floodwater:	N/A ¹	Built footprint to be sequentially located to Flood Zone A
Increase in surface run-off generation:	Increase	Surface Water Drainage Strategy undertaken
Impact on hydraulic performance of channels:	None	Development will not affect channels

Table 1: Summary of flood risks, impacts and proposed flood mitigation measures.
 N/A¹ not required for this assessment; N/A² data not available.

2. Development Description and Site Area

Proposed Development and Location

- 2.1 The proposed development is located at Land West of Ashleigh Terrace, Jersey Marine, Swansea, SA10 6JL (Figure 1 and Figure 2).
- 2.2 The existing site is currently vacant. It is understood that the development is for the construction of a light industrial site with a range of units for light engineering.



Figure 1: Location Map, identifying the location of the proposed development (Source: OS)



Figure 2: Aerial Map, identifying the location of the proposed development (Source: Google)

3. SuDS Assessment

3.1 A central component of sustainable surface water management is to demonstrate how the increases in impermeable surfaces, and the associated increases in surface water run-off will be mitigated. Fundamentally it needs to demonstrate that:

- The total rate of surface water discharged from the site will not be greater post-development than it was pre-development; and,
- The water quality discharged from the site, will not be polluted by particles and other material mobilised from the ground surfaces as a result of rainfall events.

3.2 The above objectives are achieved through the provision of surface water storage (attenuation) and the provision of Sustainable Drainage Systems (SuDS). Surface water run-off generated by development sites, where impermeable surface areas are increased, have the potential to exacerbate flood risk to others, by increasing the peak rate of surface water discharged from the Site.

3.3 This drainage strategy has considered the requirements of the 2019 Statutory requirements for ‘Sustainable drainage systems on new developments’¹. Therefore, at this stage the ‘Sustainable Drainage Systems Standards for Wales’ has been reviewed, and each of the 6 Standards (S) are assessed below.

S1. Surface water runoff destination

Priority	Commentary	Implemented?
Priority Level 1: Surface water runoff is collected for use;	Rainwater harvesting (either complex or simple water butts) will be considered during the detailed design.	Yes
Priority Level 2: Surface water runoff is infiltrated to ground;	Due to the proposed development being for light industrial use, it is considered inappropriate to infiltrate the runoff prior to treatment through the proposed permeable paving and pond.	No
Priority Level 3: Surface water runoff is discharged to a surface water body;	It is proposed to discharge all surface water from the development into the pond to be constructed in the east of the site. This in turn can be discharged to the canal located to the north of the site or to the ditch located to the south of the site.	Yes
Priority Level 4: Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;	Unlikely to be required, due to the prevalence of surface water bodies surrounding the site.	No
Priority Level 5: Surface water runoff is discharged to a combined sewer.		No

¹<https://gweddiill.gov.wales/topics/environmentcountryside/epg/flooding/drainage/?lang=en>

S2. Surface water runoff hydraulic control

Priority	Commentary	Implemented?
Surface water should be managed to prevent, so far as possible, any discharge from the site for the majority of rainfall events of less than 5mm.	Surface water runoff rate to be limited by the installation of permeable paving and a pond.	Yes
The surface water runoff rate for the 1 in 1 year return period event (or agreed equivalent) should be controlled to help mitigate the negative impacts of the development runoff on the morphology and associated ecology of the receiving surface water bodies.	Installation of a pond has the potential to improve the ecology on site.	Yes
The surface water runoff (rate and volume) for the 1% (1 in 100 year) return period event (or agreed equivalent) should be controlled to help mitigate negative impacts of the development on flood risk in the receiving water body.	Surface water runoff rate has been limited to prevent negative impacts to surrounding water bodies.	Yes
The surface water runoff for events up to the 1% (1 in 100 year) return period (or agreed equivalent) should be managed to protect people and property on and adjacent to the site from flooding from the drainage system	The potential risk to people and property on and adjacent to the site as a result of flooding from the drainage system has been assessed.	Yes
The risks (both on site and off site) associated with the surface water runoff for events greater than the 1% (1 in 100 year) return period should be considered. Where the consequences are excessive in terms of social disruption, damage or risk to life, mitigating proposals should be developed to reduce these impacts.	The proposed development is for a light industrial use. Additionally, the proposed development is located in a fairly rural area. As such, the consequences in terms of social disruption, damage or risk to life could be considered to be relatively low. In the event of a severe weather event, the site should be closed until it is deemed safe to return.	Yes
Drainage design proposals should be examined for the likelihood and consequences of any potential failure scenarios (e.g. structural failure or blockage), and the associated flood risks managed where possible.	The installation of permeable paving will enable the filtration of material entering the drainage system.	Yes

S3. Water Quality

- 3.4 Adequate treatment must be delivered to the water runoff to remove pollutants through SuDS devices, which are able to provide pollution mitigation. Pollution Hazards and the SuDS Mitigation have been indexed in the CIRIA 753 'The SUDS Manual'.
- 3.5 The suitability of SuDS components has been assessed (based on Table 3 below) to determine which methods are appropriate to be used within the proposed development.
- 3.6 Depending on the final arrangement of the proposed development these volumes could be accommodated in swales, storage ponds, permeable paving and/or geocellular storage as necessary. The location and form of the storage will need to be determined at detailed design stage.

Suitability of SuDS Components		
SuDS Component	Description	Suitability
Infiltrating SuDS	Infiltration can contribute to reducing runoff rates and volumes while supporting baseflow and groundwater recharge processes. The suitability and infiltration rate depends on the permeability of the surrounding soils	✓ (subject to confirmation)
Permeable Pavement	Pervious surfaces can be used in combination with aggregate sub-base and/or geocellular/modular storage to attenuate and/or infiltrate runoff from surrounding surfaces and roofs. Liners can be used where ground conditions are not suitable for infiltration	✓
Green Roofs	Green Roofs provide areas of visual benefit, ecological value, enhanced building performance and the reduction of surface water runoff. They are generally more costly to install and maintain than conventional roofs but can provide many long-term benefits and reduce the on-site storage volumes	x
Rainwater Harvesting	Rainwater Harvesting is the collection of rainwater runoff for use. It can be collected from roofs or other impermeable area, stored, treated (where required) and then used as a supply of water for domestic, commercial and industrial properties	✓
Swales	Swales are designed to convey, treat and attenuate surface water runoff and provide aesthetic and biodiversity benefits. They can replace conventional pipework as a means of conveying runoff, however space constraints of some sites can make it difficult incorporating them into the design	✓
Rills and Channels	Rills and Channels keep runoff on the surface and convey runoff along the surface to downstream SuDS components. They can be incorporated into the design to provide a visually appealing method of conveyance, they also provide effectiveness in pre-treatment removal of silts	✓
Bioretention Systems	Bioretention systems can reduce runoff rates and volumes and treat pollution through the use of engineer soils and vegetation. They are particularly effective in delivering interception, but can also be an attractive landscape feature whilst providing habitat and biodiversity	✓
Retention Ponds and Wetlands	Ponds and wetlands are features with a permanent pool of water that provide both attenuation and treatment of surface water runoff. They enhance treatment processes and have great amenity and biodiversity benefits. Often a flow control system at the outfall controls the rates of discharge for a range of water levels during storm events	x
Detention Basins	Detention Basins are landscaped depressions that are usually dry except during and immediately following storm events, and can be used as a recreational or other amenity facility. They generally appropriate to manage high volumes of surface water from larger sites such as a neighbourhoods	x
Geocellular Systems	Attenuation storage tanks are used to create a below-ground void space for the temporary storage of surface water before infiltration, controlled release or use. The inherent flexibility in size and shape means they can be tailored to suit the specific characteristics and requirements of any site	✓
Proprietary Treatment Systems	Proprietary treatment systems are manufactured products that remove specific pollutants from surface water runoff. They are especially useful where site constraints preclude the use of other methods and can be useful in reducing the maintenance requirements of downstream SuDS	✓
Filter Drains and Filter Strips	Filter drains are shallow trenches filled with stone, gravel that create temporary subsurface storage for the attenuation, conveyance and filtration of surface water runoff. Filter strips are uniformly graded and gently sloping strips of grass or dense vegetation, designed to treat runoff from adjacent impermeable areas by promoting sedimentation, filtration and infiltration	✓

Table 2: Suitability of SuDS components

- 3.7 Based on the above table a wide range of SuDS solutions could be utilised at this site subject to the final design arrangement. Based on the outline plan detention basins and retention ponds have been discounted due to the level of development indicated. Should the layout be amended these may be able to be incorporated into the development.
- 3.8 It is assumed the water will be drained either to the canal located north of the proposed development or to the storm water ditch on the south side of the road along the southern boundary of the site. The client owns

land up to the canal as indicated in Fig A1 in Appendix A and up to the highway boundary on the south. Therefore, both options should be feasible and should be explored at detailed design stage, and in consultation with the relevant approving authorities.

- 3.9 Pollution Hazards have been indexed within the Ciria SuDS Manual Table 26.2 as shown below. The proposed development is for the construction of a light industrial site. To be conservative, the proposed development is considered to have a 'High' Pollution Hazard Level.

TABLE 26.2 Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

Table 3: Pollution Hazards indexed within the Ciria SuDS Manual

- 3.10 The Ciria SuDS Manual states that:

Where the mitigation index of an individual component is insufficient, two components (or more) in series will be required, where:

$$\text{Total SuDS mitigation index} = \text{mitigation index}_1 + 0.5 (\text{mitigation index}_2)$$

Where:

$$\text{Mitigation index}_n = \text{mitigation index for component } n$$

A factor of 0.5 is used to account for the reduced performance of secondary or tertiary components associated with already reduced inflow concentrations.

- 3.11 As the scheme is at outline stage, the treatment train will need to be derived to ensure adequate treatment is offered to runoff to prevent contamination of offsite watercourses. Table 26.3 of the Ciria SuDS manual below highlights treatment indices for various SuDS elements, which can be incorporated in the treatment train. If a treatment train is derived from proprietary treatment, each element will need to be chosen to remove individual contamination elements in the treatment train.

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters			
Type of SuDS component	Mitigation indices¹		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond ⁴	0.7 ³	0.7	0.5
Wetland	0.8 ³	0.8	0.8
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Table 4: Ciria SuDS manual - treatment indices for various SuDS elements

- 3.12 It is recommended that permeable paving discharging into a pond is incorporated in the treatment train. The mitigation index calculations for this arrangement are outlined below:

	Pollution Hazard Index	Permeable Paving Mitigation Index	Pond Mitigation Index	Total Mitigation Index
Total Suspended Solids	0.8	0.7	0.7	1.05
Metals	0.8	0.6	0.7	0.95
Hydrocarbons	0.9	0.7	0.5	0.95

Table 5: Proposed Mitigation Index Calculations

- 3.13 Therefore, the Pollution Hazards identified within the Ciria SuDS Manual can be mitigated through the installation of permeable paving, which would then discharge into the pond located to the east of the proposed development site.

S4. Amenity & S5. Biodiversity

- 3.14 It is recommended that, as part of the proposed pond design, appropriate planting is included to enhance biodiversity in this area of the site.
- 3.15 Additionally, where possible, planting of native flora should be included as part of the design to encourage local wildlife to utilise grassed and planted areas.
- 3.16 Details of the landscaping arrangements on site, will, where practicable, include for the provision of rain-gardens.

S6. Design of drainage for construction, operation and maintenance

3.17 All onsite SuDS and drainage systems will be privately maintained. A long-term maintenance regime should be agreed with the site owners before adoption. In addition to a long-term maintenance regime it is recommended that all drainage elements implemented on site should be inspected following the first rainfall event post-construction and monthly for the first quarter following construction. Tables 6 and 7 below outline the maintenance regime for below ground drainage on site.

Item	Visual Inspection	Cleanse / De-sludge	CCTV Survey	Comments
Foul Drainage System (pipework, chambers etc.)	5 years	10 years	10 years	Cleansing to be carried as necessary
Surface Water Drainage System (pipework, chambers etc.)	5 years	10 years	10 years	Cleansing to be carried as necessary
Gullies/Channels	1 year	1 year	N/A	Cleansing to be carried as necessary
Petrol interceptor: Chamber & Alarm	1 year	1 year	N/A	Maintenance in accordance with manufacturer's instructions
Soakaways and catchpits	1 year		N/A	Cleansing to be carried as necessary
Permeable Tarmac Paving	1 year	'Swept' clean of debris every 2 years.	N/A	Jetwash or suction roadsweep permeable tarmac as performance levels reduce.
Permeable Block Paving	1 year	'Swept' clean of debris every 2 years.	N/A	Lift blocks and remove sand bedding and replace and re-bed paving – refer to individual manufacturers recommendations.

Table 6: Schedule of Maintenance for Below Ground Drainage

Open water body Maintenance Tasks and Schedule	
TASK	SCHEDULE
Forebay inspection and cleanout	Monthly inspection. Remove sediment every 7 years or whenever the sediment volume exceeds 50% of storage volume
Volume measurement	Yearly - Dredging needed every 20 years or when 25% of permanent pool volume has
Bank mowing and inspection / stabilization of eroded areas	Monthly
Unwanted vegetation and trash removal	Monthly
Visual inspection of water quality	Monthly
Inspect / exercise all mechanical devices, valves, etc	Yearly
Inspect for structural damage, leaks, etc	Yearly
Rodent management	As needed

Table 7 – Proposed Maintenance Tasks and Schedule for a wet pond

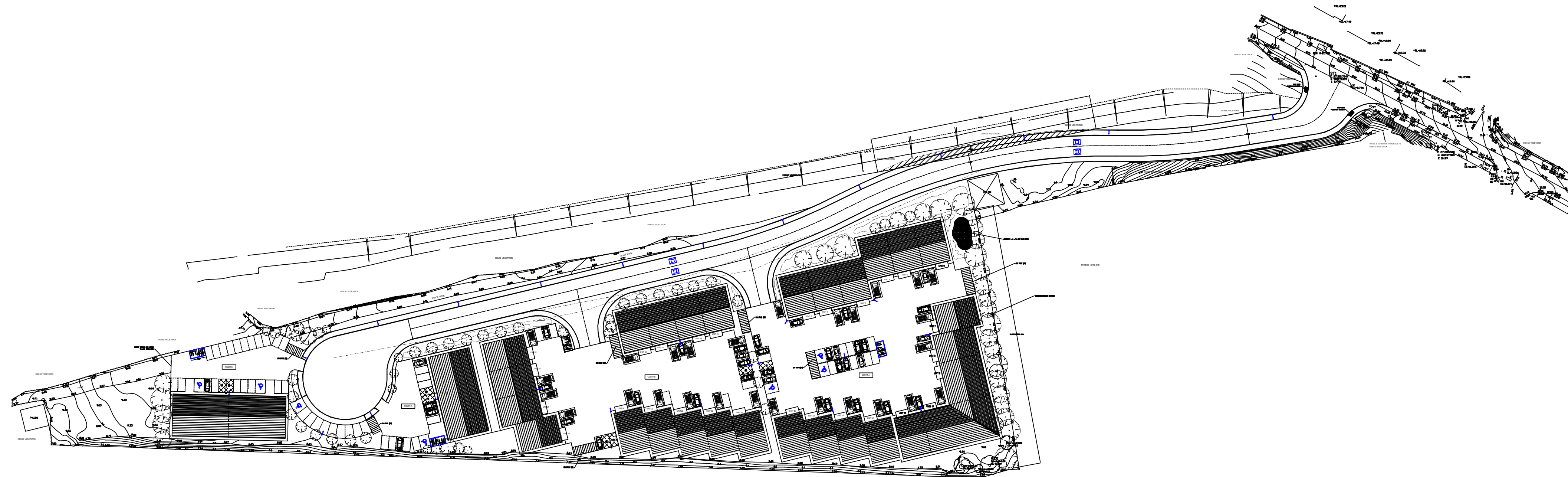
3.18 A detailed site maintenance and management plan for the surface water drainage assets will need to be developed during detailed design

4. Conclusion

- 4.1 This document presents an addendum relating to water quality and treatment to support the findings of a Flood Consequence Assessment (FCA) and Surface Water Drainage Strategy (SWDS) that has been undertaken for the proposed development on land west of Ashleigh Terrace, Jersey Marine, Swansea, SA10 6JL.
- 4.2 The existing site is vacant. The proposed development is for the construction of a light industrial site with a range of units for light engineering. It is understood that a range of light industrial units will be constructed as part of the proposed development.
- 4.3 According to low detail, national-scale flood mapping created on behalf of Natural Resources Wales (NRW), The Welsh Government's Development Advice Maps (DAMS,) referred to in TAN15, shows the site to lie within Flood Zone C2 (areas without significant flood defence infrastructure) and Flood Zone A (considered to be at little or no risk of fluvial or coastal/tidal flooding). Plans provided by the client indicate that all built footprint will be concentrated to Flood Zone A.
- 4.4 In accordance with the Technical Advice Note 15: Development and Flood risk standing advice on development and flood risk, the proposed development (industrial use) would be considered "Less Vulnerable" under TAN15.
- 4.5 Topographic levels vary between approximately 7.49mAOD and 9.88mAOD across the site (Source: *Topographic Survey provided by the client, Alpine Land Surveyors*).
- 4.6 Water treatment can be provided through incorporation of SuDS, or proprietary methods, as required to meet the final usage defined for the site.
- 4.7 As outlined within Section 3 of this report, the installation of permeable paving, which in turn would discharge into a pond to the east of the site, would provide sufficient treatment to manage the potential water quality issues on site (in accordance with the Ciria SuDS Manual).
- 4.8 As such, and given that:
 - a) the development is for the extension of a light industrial site and is classified as 'Less Vulnerable' in accordance with TAN 15;
 - b) all built development will be sequentially located to Flood Zone A (little or no flood risk from fluvial/tidal sources);
 - c) betterment can be provided by the formalisation of a flood warning and evacuation plan;
 - d) runoff will be limited to Qbar at 9.6l/s;
 - e) storage will be provided to accommodate the 1 in 100 year rainfall event including climate change;
 - f) adequate water quality treatment can be incorporated in line with the Ciria SuDS Manual,following the guidelines contained within the TAN15 and 'Recommended non-statutory standards for sustainable drainage (SuDS) in Wales 2017', the proposed development is considered **to be suitable** assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Appendix I - Site Plans

NEAREST POSTCODE: SA1 8QX
SITE GRID REFERENCE: SS710936
EASTING: 271065 / NORTHING: 193671



PARKING PROVISION.

Neath Port Talbot CBC Local Development Plan 2011 - 2026:
Parking Standards Supplementary Planning Guidance
(October 2016)

4.2 Offices

Use Class B1 Business, Class A2 Financial & Professional
Services (including Call Centres)
Zones 4 to 6
Offices (<1000m²) = 1 space per 20m²

4.5 Industry & Industrial Warehousing

Zones 5 & 6
Small Industry (< 235 m²): Operational = 1 van space,
Non-Operational = 2 spaces

B: Parking Reserved for Disabled People

For car parks associated with new employment premises - 5
% of the total car park capacity;

D: Cycle Parking Standards

e) Industry and Industrial Warehousing

Industry: Short stay = 1 stand per 1000 m², Long Stay = 1
stand per 500 m²

E: Motorcycle Parking Standards

All classes of development = 5 % of provision for car parking

A	Parking layout amended, access amended	09/19	MIS
Rev	Description	Date	Initial

Project:
PROPOSED MIXED USE LIGHT INDUSTRIAL SITE,
LAND AT JERSEY MARINE, SWANSEA

Title:
PROPOSED SITE LAYOUT (ILLUSTRATIVE)

Date: MAY 2019	Drawn: MIS
Scales(s): 1:1000 @ A2	Issue: PLANNING
Dwg No: 19/794/02	Revision: A

Disk: Jersey_Marine_SITE3.dwg

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