TECHNICAL NOTE – FLOODING AND DRAINAGE
Carmarthen Leisure Centre – Residential Development

RIDGE

Project Number		Project Name	
5030940		Carmarthen Leisure Centre Site	
Date	**Revision**	**Prepared by**	**Approved by**
10/2025	-	EH	GS

1. INTRODUCTION

1.1. This technical note has been prepared to support flooding and drainage aspects for planning pre-application consultation.

1.2. The proposed development comprises a 38 unit residential development on land south of the Carmarthen Leisure centre site, located off Llasteffan Road in Johnstown, Carmarthen.

1.3. The site covers an area of 1.52ha and is a previously formed plateau that dates from redevelopment of the site approximately 20 years ago.

2. FLOODING

2.1. Planning Policy Wales Technical Advice Note 15 - Development, flooding and coastal erosion requires the consideration of flood risk from various sources, mainly river, coastal and surface water and small watercourses.

2.2. Flood risk is designated as zones as follows:

ZONE	FLOODING FROM RIVERS	FLOODING FROM THE SEA	FLOODING FROM SURFACE WATER AND SMALL WATERCOURSE
1	Less than 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year		
2	Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.	Less than 1 in 200 (0.5%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.	Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.
3	A greater than 1 in 100 (1%) chance of flooding in a given year, including climate change.	A greater than 1 in 200 (0.5%) chance of flooding in a given year, including climate change.	A greater than 1 in 100 (1%) chance of flooding in a given year, including climate change.
TAN 15 DEFENDED ZONES	Areas where flood risk management infrastructure provides a minimum standard of protection against flooding from rivers of 1:100 (plus climate change and freeboard[4]).	Areas where flood risk management infrastructure provides a minimum standard of protection against flooding from the sea of 1:200 (plus climate change and freeboard).	Not applicable.

TABLE 1 - EXTRACT FROM TAN15 FIGURE 1

2.3. The NRW published Flood Map for Planning shows the extent of the flood risk from the various sources. Extracts of relevant mapping are shown below:

2.4. The development site is shown to be in Flood Zone 1 for flood risk from rivers

FIG.1 NRW FLOOD MAP FOR PLANNING - RIVERS

2.5. The development site is shown to be in Flood Zone 1 for flood risk from sea

FIG.2 NRW FLOOD MAP FOR PLANNING - SEA

2.6. The development site is shown to include a small area of Flood Zone 2 for flood risk form surface water and watercourses. The extent is shown to be limited. The topography of the site is a level plateau surrounded by a bund. The plateau is elevated compared to surrounding area so does not receive any surface water runoff from adjacent land. The source of the flooding can only be runoff from the development plateau itself, which because of the bunding has no route to runoff elsewhere. The development will remove the source of that surface water runoff as the area will be engineered and be served by a positive drainage system.

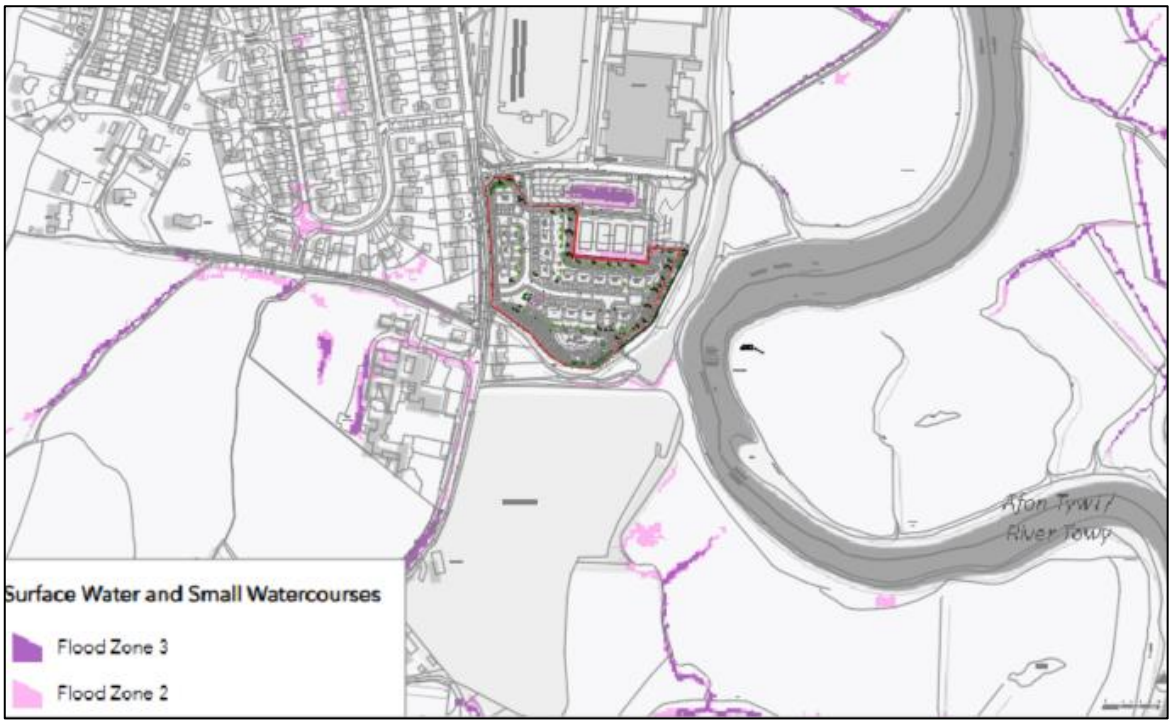

FIG.3 NRW FLOOD MAP FOR PLANNING – SURFACE WATER AND SMALL WATERCOURSES

3. SURFACE WATER DRAINAGE

3.1. The surface water drainage scheme will be subject to a SAB approval and will be designed in accordance with the Welsh Government, Sustainable Drainage (SuDS) Statutory Guidance. This provides the principles of the scheme in six standards, numbered S1 to S6 which deal in turn with as follows:

S1 - Runoff destination
S2 - Hydraulic control
S3 - Water quality
S4 - Amenity
S5 - Biodiversity
S6 - Construction, operation and maintenance

3.2. S1- Surface water runoff destination is prioritised as follows:

i. P1: Surface water runoff is collected for use, This will be used for irrigation collecting roof runoff to planter, water storage units.

ii. P2: Surface water runoff is infiltrated to ground, infiltration will be used as much as possible, by soakaway and permeable paving. We await the findings of ground investigation to quantify potential.

iii. P3: Surface water runoff is discharged to a surface water body, no water courses existing within or adjacent to the development site.

iv. P4: Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system, It is understood that an existing surface water drain exists at the eastern boundary of the development site. This discharges to the tidal reaches of the Towy. It is proposed that that outfall is used if infiltration potential is not available to the site, or as an overflow if infiltration is available but not sufficient.

v. P5: Surface water runoff is discharged to a combined sewer, this is not available to the development.

3.3. S2 - Hydraulic control, the discharge rate from the site, if runoff occurs, is to be limited.

i. Peak discharge rate in this case would be limited to the 1yr greenfield runoff rate, or as close as can be reasonably achieved.

ii. The scheme will aim to achieve interception of 80% of summer and 50% of winter rainfall events.

iii. Receiving surface water bodies will be protected by control of runoff rate and runoff volume from the development.

iv. An allowance for climate change will be applied to drainage calculations.

v. The drainage system will be designed to accommodate a 100yr return period event.

3.4. S3 - Water quality, pollution prevention measures will be applied by use of suitable mechanisms such as vegetated basin, suds planters and permeable paving systems.

3.5. S4 - Amenity and S5 – Biodiversity, will be achieved by use of open water, vegetated suds elements.

3.6. S6 - Construction, operation and maintenance, the drainage elements will be designed in such a way that promotes sustainable construction and maintenance methods and ensure structural integrity over the design life.

4. FOUL DRAINAGE

4.1. There is an existing foul sewer in public highway at the western boundary of the development site. Connection can be achieved without the need to cross third party land. The invert level of the nearest existing manhole appears to be suitable for connection of a gravity system serving the development.

4.2.

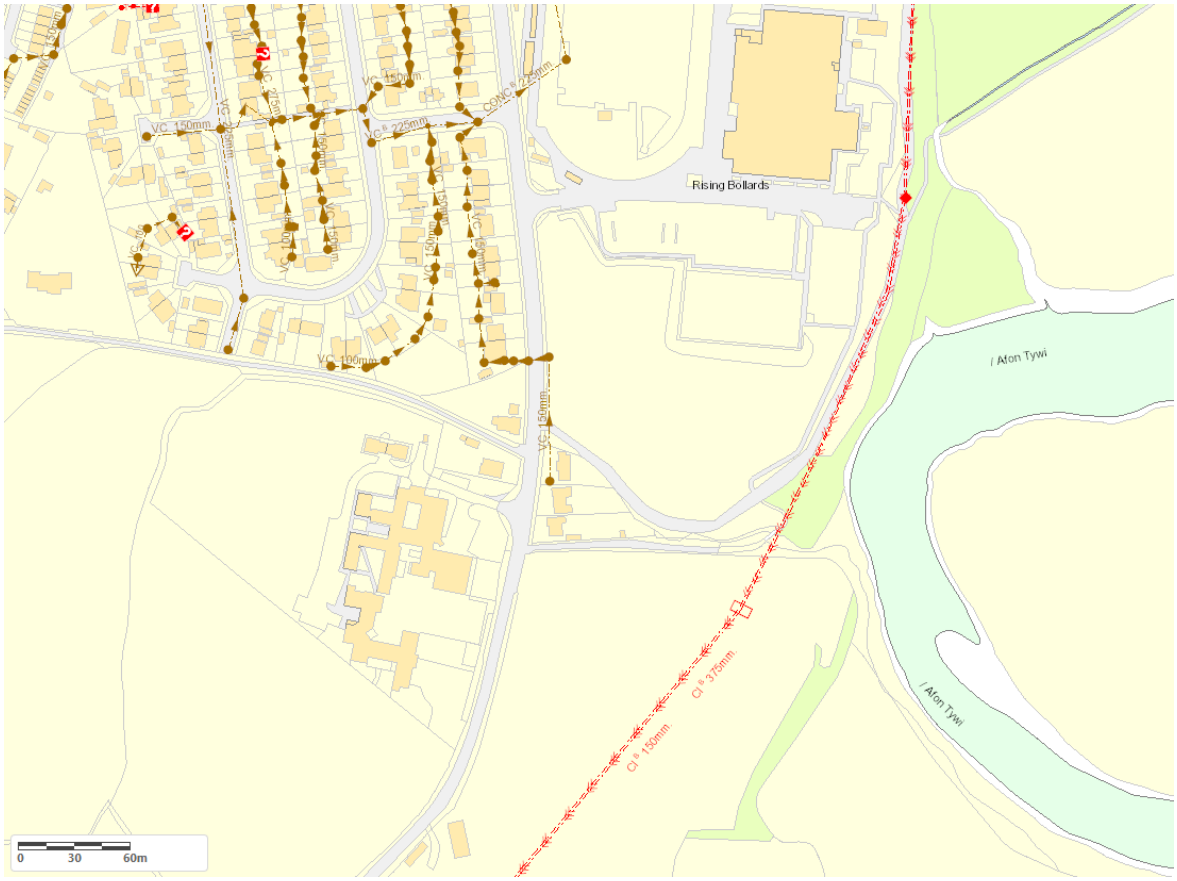

FIG.4 EXTRACT FROM DCWW ASSET MAP

4.3. A capacity check from Dwr Cymru Welsh Water will be required to confirm suitablilty. That was not available at the time of this report.

4.4. The area is subject to restrictions on foul discharge from local waste water treatment facilities. The combined sewer network serving foul drainage requirements at the Carmarthen Leisure Centre site discharges to the Parc y Splotts Wastewater Treatment Works approximately 1km south of the development site. The network reaches the WwTW by a circuitous route, heading approx. 2km northward by gravity, then is pumped back, past the site to the WwTW. Parc y Splotts WwTW discharges treated effluent to the Towy, which in turn discharges to Carmarthen Bay. This is within the Burry Inlet inner catchment of the Carmarthen Bay and Estuaries SAC.

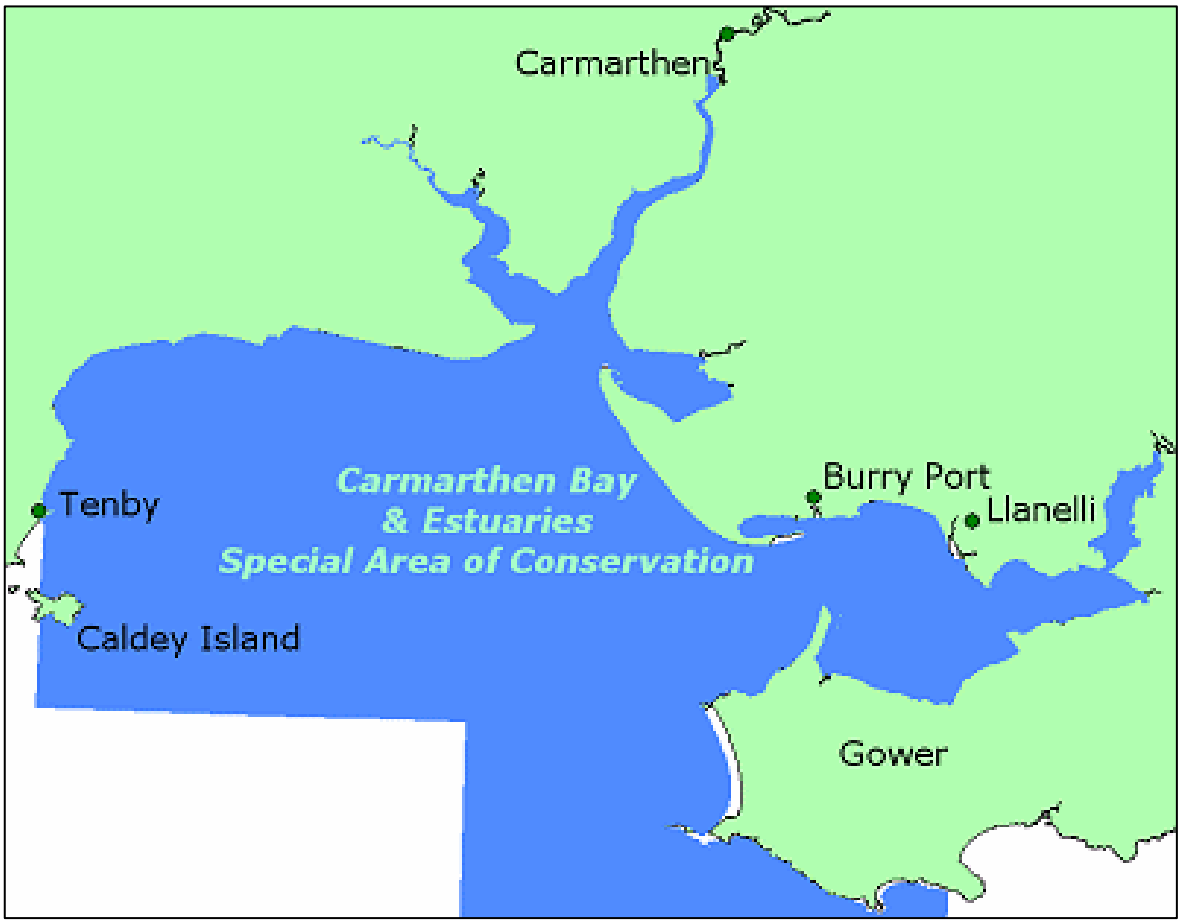

FIG.5 PLAN SHOWING CARMARTHEN BAY AND ESTUARIES SAC

4.5. Foul discharge rate for the proposed development has been calculated using the Flows and Loads methodology below. A peak discharge rate of 1.73 l/s is derived.

CONTRACT - Carmarthen Leisure Center Site

JOB NO - 5030940

RIDGE

Sheet No	1 of 1
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Checked By	EH
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Rev	A

Foul Sewer Design Flow
British Water, Flows and Loads - 4

Domestic housing

A treatment system for a single house with up to and including 3 bedrooms shall be designed for a minimum population (P) of 5 people.
The size of a treatment system for a single house with more than 3 bedrooms shall be designed by adding 1 P for each additionalbedroom to the minimum single house value of 5 P, eg:

- house with 3 bedrooms = minimum 5 P system
- house with 4 bedrooms = minimum 6 P system (5+1)
- house with 6 bedrooms = minimum 8 P system (5+3).

For groups of small 1 and 2 bedroom houses or flats
- flat with 1 bedroom = allow 3 P
- flat with 2 bedrooms = allow 4 P

A treatment system serving a group of houses shall be designed by adding together the P values for each house calculated independently, eg:
- for a group of two houses (3 and 4 bedrooms, respectively) the system shall be for a minimum of 11 P (5+6)

If the calculated total P for a group of houses exceeds 12 P then some reduction may be made to allow for the balancing effects on daily flow of a group of houses (round UP not down)
- Where the total is 13-25 P multiply the total by 0.9 to give an adjusted P value, e.g. if there are four four-bedroom houses the total P will be 24 P (4 x 6) and the adjusted P will be 22 P (24 x 0.9 = 21.6)
- Where the total is 26-50 P multiply the total by 0.8 to give an adjusted P value, e.g. if there are four three-bedroom houses and three four-bedroom houses the total P will be 38 P (4 x 5 and 3 x 6) and the adjusted P will be 31 P (38 x 0.8 = 30.4)

Where there are larger groups of houses, the P should be estimated using both the expected total load and the flow, considering both peak and total flow

These are minimum recommended population (P) loads, they should not be modified downwards, upward modification may be necessary because of particular characteristics of each property or groups of properties.

POPULATION

Dwelling Type		Number	Population, P
Flat 1 Bed	(3 P)	4	12
Flat 2 Bed	(4 P)	0	0
Flat 3 Bed	(min 5 P)	0	0
House 1 to 3 Bed	(min 5 P)	28	140
House 4 Bed	(min 6 P)	6	36
House 5 Bed	(min 7 P)	0	0
House 6 Bed	(min8 P)	0	0
Total Population, P		=	188
Adjustment Factor		=	0.8
Adjusted Population, P		=	151

ADJUSTMENT FACTOR

Population, P	Adjustment Factor
1 to 12	1.0
13 to 25	0.9
26 to 50	0.8

DOMESTIC DWELLINGS	Per person / activity /day	Flow (Litres)	BOD (Grams)	Amonia (N) (Grams)
Standard residential		150	60	8

RESULTS

Total Average Flow	=	22650.00 l/day
Total Average Flow	=	0.26 l/s
Total Peak Flow	=	DWF x 6 +10%
Total Peak Flow	=	1.73 l/s

FIG.6 FLOWS & LOADS 4 CALCULATION

4.6. NRW provides advice to planning authorities for planning applications affecting nutrient sensitive Special Areas of Conservation. For development proposals involving connection to public wastewater treatment works, that guidance states, *"Planning Authorities should then consult with the sewerage undertaker to determine whether the environmental permit for the associated wastewater treatment works has been assessed against the revised nutrient targets set out in the conservation objectives for the river SAC."* We anticipate that discussion will take place with DCWW through the consultation process for PAC.

4.7. The nutrient budget calculator provided by NRW has been used to compare predevelopment to post development phosphorus and nitrogen load generation. Given that the predevelopment site is greenfield in nature, there is no scope for compensatory nutrient removal within the site boundary.

Summary of nutrient calculation is as follows:

Final calculation of nutrient load from wastewater	
Description of values generated	**Values generated**
Additional population:	**151.05**
Annual wastewater production (litres):	**8275651.88**
Annual phosphorus load (kg TP/year):	**80.27**
Annual nitrogen load (kg TN/year):	**603.30**

Total phosphorus budget	
Description of phosphorus values generated	**Values generated**
Stage 1 phosphorus load (kg TP/year):	**80.27**
Stage 2 phosphorus reduction (kg TP/year):	**0.03**
Stage 3 phosphorus load (kg TP/year):	**1.52**
Stage 3S phosphorus load removed through SuDS (kg TP/year):	**0.52**
Phosphorus budget ((Stage 1 - Stage 2) + (Stage 3 - Stage 3S)):	**81.24**
Phosphorus budget + 20% buffer	**97.49 kg TP/year requires mitigation**
Total nitrogen generated	
Description of nitrogen values generated	**Values generated**
Stage 1 nitrogen load (kg TN/year):	**603.30**
Stage 2 nitrogen reduction (kg TN/year):	**4.50**
Stage 3 nitrogen load (kg TN/year):	**16.90**
Stage 3S nitrogen load removed through SuDS (TN kg/year):	**4.43**
Nitrogen budget ((Stage 1 - Stage 2) + (Stage 3 - Stage 3S)):	**611.27**
Nitrogen budget + 20% buffer:	**733.53 kg TN/year will be generated**

4.8. Given the scale of the development, it is likely that the environmental permit held by DCWW for the associated Parc y Splotts Wastewater Treatment Works will have the necessary headroom to accommodate the development.

4.9. If the WwTW cannot accommodate the nutrient loading within the current permit, it may be possible to investigate potential for compensatory nutrient removal elsewhere within the same catchment.