HCE

Civil Structural Surveys Project Management

Report Title: **HSE Risk Assessment of Proposed Basin**

Address: **Marcholws, Peniel, Carms, SA32 7AA**

Client: **Mrs Anwen Butler**

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1.0 INTRODUCTION

The CIRIA C753 Suds Manual and guidance documents have been used to prepare the following health and safety risk assessment for the proposed ~150m2 basin within the agricultural building development at Marcholws, Peniel, Carms, SA32 7AA.

The basin will form part of the integrated SUDs system proposed to control and treat surface water run-off. The basin will also create a visual and wildlife amenity for the development and create an attractive environment in which users can enjoy. One of the key attributes of the basin will be the additional water quality treatment and biodiversity benefits that it will offer.

The basin will have a maximum fill level of around 400mm in design storm conditions. Given the outlet level (at the base of the basin), the normal level will be 0mm, providing a wetland basin area. The depth will vary depending upon the seasons. During storm conditions, the fill level is controlled via an outlet which discharges via a catchpit with integrated flow control of 1.3litres/second to the existing stream on site.

During extreme weather events e.g. 100year+30%, the maximum level within the basin is determined by the run-off from the catchment area including the new agricultural buildings.

The maximum water level within the basin 400mm. The total basin depth is proposed at ~0.4m (to account for minimum feeder pipe depths under permeable roads). Hence, the freeboard is calculated to be approximately 0.3m. The grassed sides of basin will be at a maximum of 1:3 gradient.

The amount of freeboard allows the basin to be used for any exceedance events, and the topography of the site will convey water from the basin to the filter strip. This will help reduce surface flooding should extreme weather events greater than 100year storms +30% CC occur.

The risk assessment is split into the following categories;

i. Site Information & Establishing Context
ii. Hazard Identification
iii. Risk Assessment of Hazards including mitigation
iv. Summary of Assessments

The hazard identification and risk assessment is undertaken using the SUDS Risk Matrix shown in Figure 1 [Ref.4].

Table 2 Risk Matrix

Likelihood		Consequence: Insignificant – No injury or health effects	Minor – Minor injury or health effects	Moderate – Injury but not life threatening. Some ill health effects	Major – Serious injury. Dangerous near miss. Serious ill health	Extreme – Serious injury or death. Serious life threatening disease
Almost Certain (frequent)	Is expected to occur/recur frequently or within a short period of time (most weeks or months)	M	M	H	E	E
Likely (probable)	Will probably occur/recur in most circumstances (several times a year)	L	M	H	H	E
Possible (occasional)	Possibly will occur/recur occasionally (once every few years)	L	M	M	H	H
Unlikely (uncommon)	Uncommon; might occur/recur at some time in the future	L	L	M	M	H
Rare (remote)	Unlikely to occur/recur; may only happen in exceptional circumstances	L	L	L	L	M

Table 3 Risk Rating

Risk	Action
Extreme Risk (E)	Design stage - Not acceptable – design must be changed Management stage - Immediate attention and response needed to reduce the level of risk
High Risk (H)	Design stage - Not acceptable – design must be changed Management stage - Attention and response needed to reduce the level of risk
Medium Risk (M)	Design stage – Review if it is practical and reasonable to change design to reduce level of risk Management stage – Review options to see if there are practical and reasonable options to reduce risk
Low Risk (L)	Design stage - Acceptable – no changes required Management stage - No response needed to reduce the level of risk, continue to review on regular basis

Figure 1: SUDS Risk Assessment Matrix

2.0 Risk Assessment

CwrtTable B.5 Suds Health And Safety Risk Assessment Checklist	
Site/system overview	
Site ID	Marcholws, Peniel
Asset ID	Detention Basin
Location	Marcholws, Peniel, Carms, SA32 7AA
SuDS component	Detention Basin
Assessment date	21/05/2026
Date of next assessment	
1 Establish context	
General description of component and its operation	A basin which under normal conditions is shallow with a depth of 0mm. The basin is designed to attenuate the SW run-off from the agricultural buildings and will attenuate all flows including the 100year +30% climatic change storm event. The basin discharges to the adjacent stream at a discharge rate of 1.3 litres per second (Qbar). Under the 100year +30% storm event the water level is expected to rise to 400mm maximum change of circa 400mm above the normal level. The basin depth is ~0.4m, giving a freeboard of around 0.3m. This would in an exceedance event provide a maximum additional storage of 39.4m3 based upon the estimated plan area of 150m2. The basin also provides substantial water quality improvement and an attractive amenity feature, improving the aesthetics and environment of the development in addition to encouraging wildlife into the development to improve and increase biodiversity.
2 Identify potential hazards	Are hazards present? (Y/N)
Drowning or falling through ice in winter	If YES complete Section 3
Slips, trips and falls	If YES complete Section 4
Entry into pipes or confined spaces (note this is for inadvertent public access; follow relevant legislation and guidance for worker	If YES complete Section 5
Water quality – health risk	If YES complete Section 6

3 Drowning or falling through ice in winter		
Consider factors that might affect: • **the likelihood of people entering the water/accessing the ice** • **the potential consequence of entering the water/accessing the ice**	**Summary of influence of factor on likelihood of entry/access, including justification (consider for children < 5 years, children ≥ 5 years, adults)**	**Summary of influence of factor on consequence of entry or access, including justification (consider for children < 5 years, children ≥ 5 years, adults)**
Environmental factors		
Proximity to populated areas: schools, inns, retail/tourism, picnic areas, play areas, car park, roads, especially attractive features likely to be visited	Basin is situated within a private site with a family living there. It can be anticipated that young children will have access.	
Features allowing or encouraging access (eg paths)	No formal paths lead to the basin. Access via agricultural tracks used primarily by farm vehicles	
Physical accessibility of proposed drainage feature: consider intended use and inadvertent access (including of small children)	Possibility of unintended access by small children especially if unsupervised.	
Visibility and natural surveillance of proposed drainage features	The basin is situated in an open area of the development and should therefore be visible from a large area of the development.	
Behavioral factors		
Category and volume of expected users: swimmers, anglers, walkers, drivers, specialist water users, General public, dog walkers, teenagers, accompanied/unaccompanied children	No swimmers, anglers, dog walkers, specialist water users. Expected walers, teenagers and accompanied/ unaccompanied children.	
Nature of development (housing, commercial, industrial etc)	Agricultural – new farm buildings.	

Any known existing risks (eg records of accidents) posed by water/drainage features at or close to the site?	NA	
Design factors – water's edge		
Type and nature of water-edge planting	Bull Reeds and grass to discourage wading / paddling, making the basin and attractive amenity aesthetically and for wildlife whilst discouraging human access for recreational use.	
Definition of water edge and nature of ground (eg soft/hard)	Soft – Grass	
Natural obstacles, barriers/fencing	No natural obstacles.	
Height of edge above water	~0.4m above maximum water level	
Gradient and extent of slopes above, at and below water level	1:3 within grass sides.	

Note For definition of levels, see **Table 36.2 in Chapter 36**.

3 Drowning or falling through ice in winter		
Consider factors that might affect: • **the likelihood of people entering the water/accessing the ice** • **the potential consequence of entering the water/accessing the ice**	**Summary of influence of factor on likelihood of entry/access, including justification (consider for children < 5 years, children ≥ 5 years, adults)**	**Summary of influence of factor on consequence of entry or access, including justification (consider for children < 5 years, children ≥ 5 years, adults)**
Design factors – water body		
Water depth profile	Max 400mm depth with stepped profile. Typical Water depth = 0mm	
Water surface area	~150m2	
Clarity	Clear water	
Underwater obstacles or traps	Proposed Wetland Planting	
Potential currents, velocities	Very Low	
Potential increase in depth of water and rate of rise	Maximum calculated depth under 100year storm +30%climate change is 400mm giving a max depth of 400mm.	
Potential for ice formation and significant depth of water below in winter	Very Low	
Public education		
Signage	Warning Signs to be erected.	
Community engagement strategies	NA	
Local education strategies (eg schools)	Install a simple weatherproof sign at or near the basin explaining it is a storm drainage feature, dry except during heavy rainfall, and warning of the risk of entry during storm events	

Overall assessment of likelihood of entry/access and consequences	Likelihood	Consequences
Children < 5 years Children > 5 years Adults	Low	Low – since stepped sides are provided and water levels below 1m.

Summary of section 3 risk assessment for drowning or falling through ice						
Group	**Likelihood of entry to water**	**Likely consequence of entry to water**	**Overall level of risk posed by the design[1]**	**Further mitigation measures required**	**Action date**	**Final level of risk[1]**
Children < 5 years Children > 5 years Adults	Unlikely Unlikely Rare	Moderate Minor Minor/Insignificant Low	Medium Low Low	Signage to be provided. Safety information provided to visitors. ~0.3m freeboard provided. Stepped sides provided.		Low

Note For definition of levels, see **Table 36.2 in Chapter 36**.

4 Slips/trips/falls		
Factors that might affect likelihood of people slipping/tripping/falling	**Summary of influence of factor on likelihood of slip/ trip/fall, including justification (consider for children < 5 years, children ≥ 5 years, adults)**	**Summary of influence of factor on consequence of slip/ trip/fall, including justification (consider for children < 5 years, children ≥ 5 years, adults)**
Design factors – inlets and outlets or channels		
Headwall or channel location	` Unlikely - Headwalls Built into bank of Basin	Low

Headwall height or channel depth and width	Unlikely - At ground level	Low
Slope of headwall or channel profile	Unlikely - Vertical sides	Low
Channels – profile and risk of freezing water	N/A	N/A
Design factors – surfaces		
Level changes	Possible – General Slope to basin	Minor
Surfacing materials	Unlikely - Grass	Low

Summary of section 4 risk assessment for slips/trips/falls

Group	Likelihood of slips/ trips/falls/other injury	Likely consequence of slips/trips/falls/other injury	Overall level of risk posed by the design[1]	Further mitigation measures required	Action date	Final level of risk[1]
Children < 5 years Children ≥ 5 years Adults	Possible Unlikely Rare	Minor Minor Minor	Low Low Low	None		Low

Note

For definition of levels, see **Table 36.2 in Chapter 36**.

5 Entry into pipes or confined spaces (Note: This risk assessment covers inadvertent access by the public. Where specific access is required by workers the requirements of relevant health and safety legislation and guidance should be followed.)		
Factors that might affect likelihood of people entering pipes or confined spaces	**Summary of influence of factor on likelihood of entry into pipes or confined spaces, including justification (consider for children < 5 years, children ≥ 5 years, adults)**	**Summary of influence of factor on consequence of entering pipe or confined space, including justification (consider for children < 5 years, children ≥ 5 years, adults)**
Design factors – inlets and outlets		
Pipe diameter	100mm	N/A
Are grilles provided?	Yes	
Design factors – chambers		
Depth of chamber	N/A	N/a
Is access possible?	Not to visitors/ public.	

Summary of section 5 risk assessment for entry into pipes/confined spaces						
Group	**Likelihood of entry into pipes/ confined spaces**	**Likely consequence of entry into pipes/ confined spaces[1]**	**Overall level of risk posed by the design**	**Further mitigation measures required**	**Action date**	**Final level of risk[1]**
Children < 5 years Children ≥ 5 years Adults	Low Low Low	Insignificant Insignificant Insignificant	Low Low Low	None		Low

Note

For definition of levels, see **Table 36.2 in Chapter 36**.

6 Health issues		
Factors that might affect likelihood of people suffering from ill health due to SuDS water quality	**Summary of influence of factor on likelihood of poor health, including justification (consider for children < 5 years, children ≥ 5 years, adults)**	**Summary of influence of factor on consequence of resulting ill health, including justification (consider for children < 5 years, children ≥ 5 years, adults)**
Pollution treatment strategy		
Level of contamination of publicly accessible water	CIRIA Assessment completed. Low Contamination Risks	
Likely contamination from rat urine	Possible	
Likely contamination from dog or bird fouling	Birds Likely – Dogs may be present on field.	
Likelihood of toxic algal blooms	Unlikely due to typical water level ~ 0mm in wetland basin.	
Likelihood of vectors (organism which carries disease-causing microorganisms from one host to another)	Unlikely	
Public accessibility to any sediment accumulation zones	Deterents provided with signage.	
Public education and risk management		
Signs	Provided	
Community engagement strategies	NA	
Local education strategies (eg schools)	NA	
Litter management and control	Provided by site staff.	
Dog fouling management and control	NA	

Summary of section 5 risk assessment for health issues						
Group	**Likelihood of ill health**	**Likely consequence of ill health**	**Overall level of risk posed by the design**	**Further mitigation measures required**	**Action date**	**Final level of risk**
Children < 5 years Children ≥ 5 years Adults	Low Low Low	Minor Minor Minor	Low Low Low	None		Low

Note

For definition of levels, see **Table 36.2 in Chapter 36**.

3.0 REFERENCES

1. HCE Storm Water Drainage Plan HCE-1841-CVD-002
2. HCE Drainage Calculations, Doc. HCE-1841-CVD-CAL-001
3. CIRIA Document Titled SUDS Design Manual C753
4. CIRIA Document health and safety principles for SuDS RP992/17 dated November 2013