

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD							
Date By Checked		May-26 RD IH		Job no. 1841		Section C&S		Sheet no.		Rev C01		Canolfan Gorseion Centre Millers Drive Gorseion SA4 4QN	
Rev		Date		Details								Tel: 01792 805010	
Part													
Calculation Front Cover													
REF												OUTPUT	
		Storm Water Drainage Calculations: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA											

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	SuDS Considerations	SC/01 - 02	
	Storm Water	SW/01 - 24	
	Interception Compliance	IN/01	
	Infiltration Basin	IB/01	
	Trial Pit Logs & Location Plan	TL/01 - 03	
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Design Summary							
REF							OUTPUT
	BS Codes		BSEN 752				
	Building Regulations		Part H, Building Regulations 2015				
	CIRIA		CIRIA C756 SUDS Design Manual				
	Roof Drainge Rainfall Intensity		Roof Drainage 0.014 l/s/m ²				
	Paved Area Rainfall Intensity		Paved Area M5-60 = 17 mm Return Period 1 in 100 years 'r ' 0.3 % for climate change 30%				
	Foul Drainage Design Rate		Foul Water For Single 2.5 l/s Dwelling				

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SuDS Considerations											
REF										OUTPUT	
		<u>Standard S1 -Surface water runoff destination</u> <u>Priority Level 1</u> No roof runoff is planned for reuse within the changing facility, a proportion of runoff will be utilised for plant growth within the proposed rainwater planters. <u>Priority Level 2</u> On site infiltration testing (14.04.2026) determined the existing substrata below 0.3m to approximately 1.5m bgl is impermeable. Hence, an infiltration basin is to be proposed at a maximum depth = 0.4m. <u>Priority Level 3</u> All Surface Water Runoff Managed at Priority Level 2 <u>Priority Level 4</u> All Surface Water Runoff Managed at Priority Level 2 <u>Priority Level 5</u> All Surface Water Runoff Managed at Priority Level 2 <u>Standard S2 - Surface water runoff hydraulic control</u> To manage the surface water runoff from the proposed new Unit A, Unit B, Unit C and Agricultural Unit buildings, roof runoff will be coveyed via downpipes to rainwater planters. The runoff will then be coveyed via shallow pipes layed at a 1:200 gradient to an infiltration basin. The basin is to be designed to provide the required attenuation prior to infiltration. This will help mitigate negative impacts of the development on flood risk and protect both people and property from flooding under the 100yr + 30% climate change event.									

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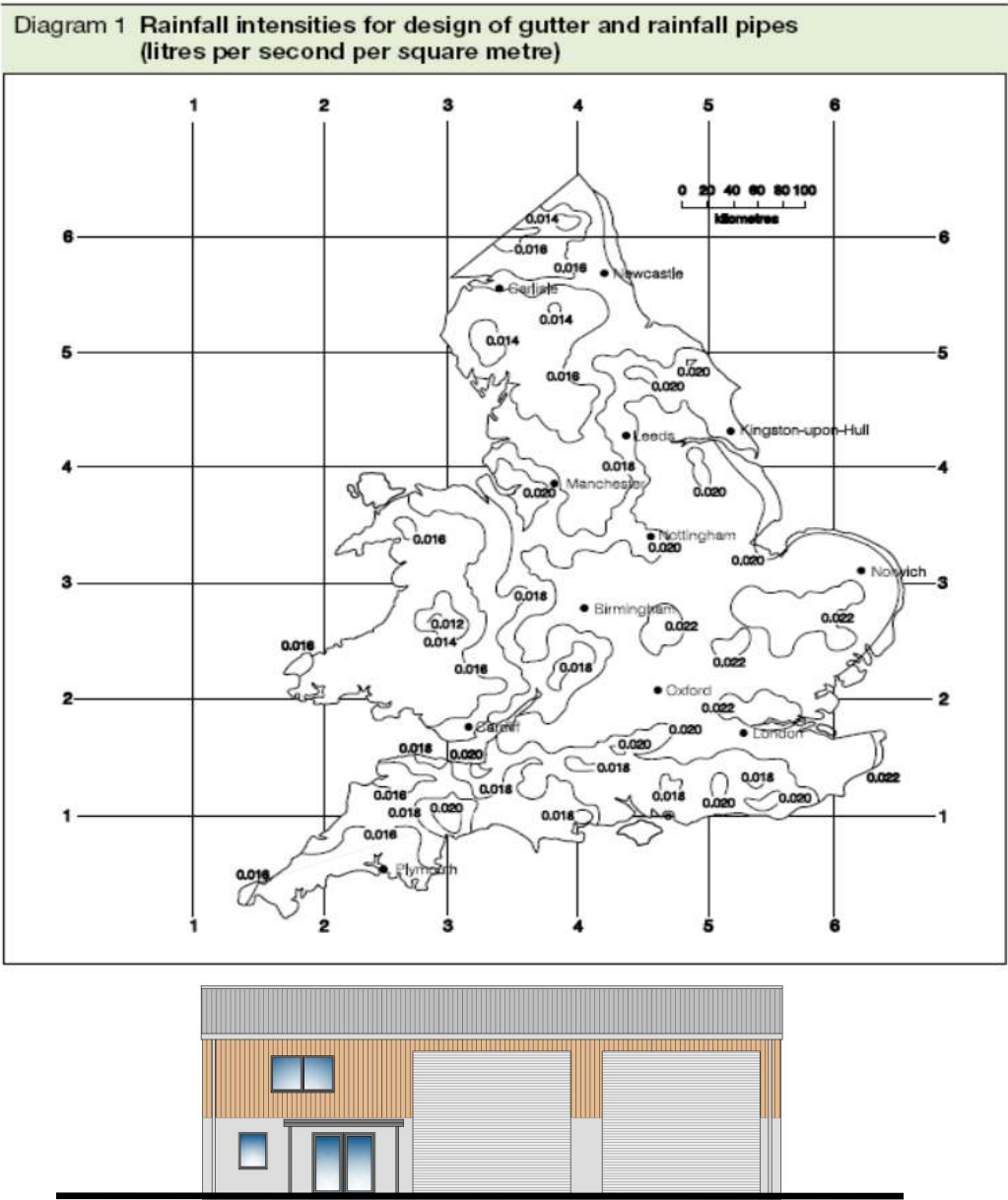
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Part	Storm Water - Roof Drainage UNIT A
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REF	OUTPUT
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Part H3 Rainfal Intensity = 0.014 l/s/m²

Diagram 1



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Part

Storm Water - Roof Drainage UNIT A

REF
 H3.CI 1.3,

Gutter Design (Main Roof)
 Roof Area = 216 m²
 Roof Pitch = 15 Degrees
 Effective Area Factor = 1.13
 Effective Roof Area = 244.99 m²

Gutter Design (Other Roofed Areas)
 Roof Area = 0 m²
 Roof Pitch = 0 Degrees
 Effective Area Factor = 1.00
 Effective Roof Area = 0 m²

OUTPUT

T1. Part H3

Table 1 Calculation of drained area	
Type of surface	Effective design area
1 Flat roof	plan area of relevant portion
2 Pitched roof at 30° Pitched roof at 45° Pitched roof at 60°	plan area of portion x 1.29 plan area of portion x 1.50 plan area of portion x 1.87
3 Pitched roof over 70° or any wall	elevational area x 0.5

unit c 432
 unit b 215
 unit a 216

T2. Part H3

Table 2 Gutter sizes and outlet sizes			
Max. effective roof area (m ²)	Gutter size (mm diam.)	Outlet size (mm diam.)	Flow capacity (litres/sec)
6.0	-	-	-
18.0	75	50	0.38
37.0	100	63	0.78
53.0	115	63	1.11
65.0	125	75	1.37
103.0	150	89	2.16

Note: Refers to nominal half round eaves gutters laid level with outlets at one end sharp edged. Round edged outlets allow smaller downpipe sizes.

Option: Automatic

From Table 2 above provide:

Gutter Size = 125
 No. of RWP's = 4

Maximum effective area served by x1 gutter & RWP = 61.2468 m²
 Max allowable effective area = 65 m² > 61.2468 m² **OK**

H3. CI.1.10 Provide minimum 125 mm gutters with 75 mm diameter downpipes.

Total Roof Discharge Flow Rate = 3.43 l/s per dwelling

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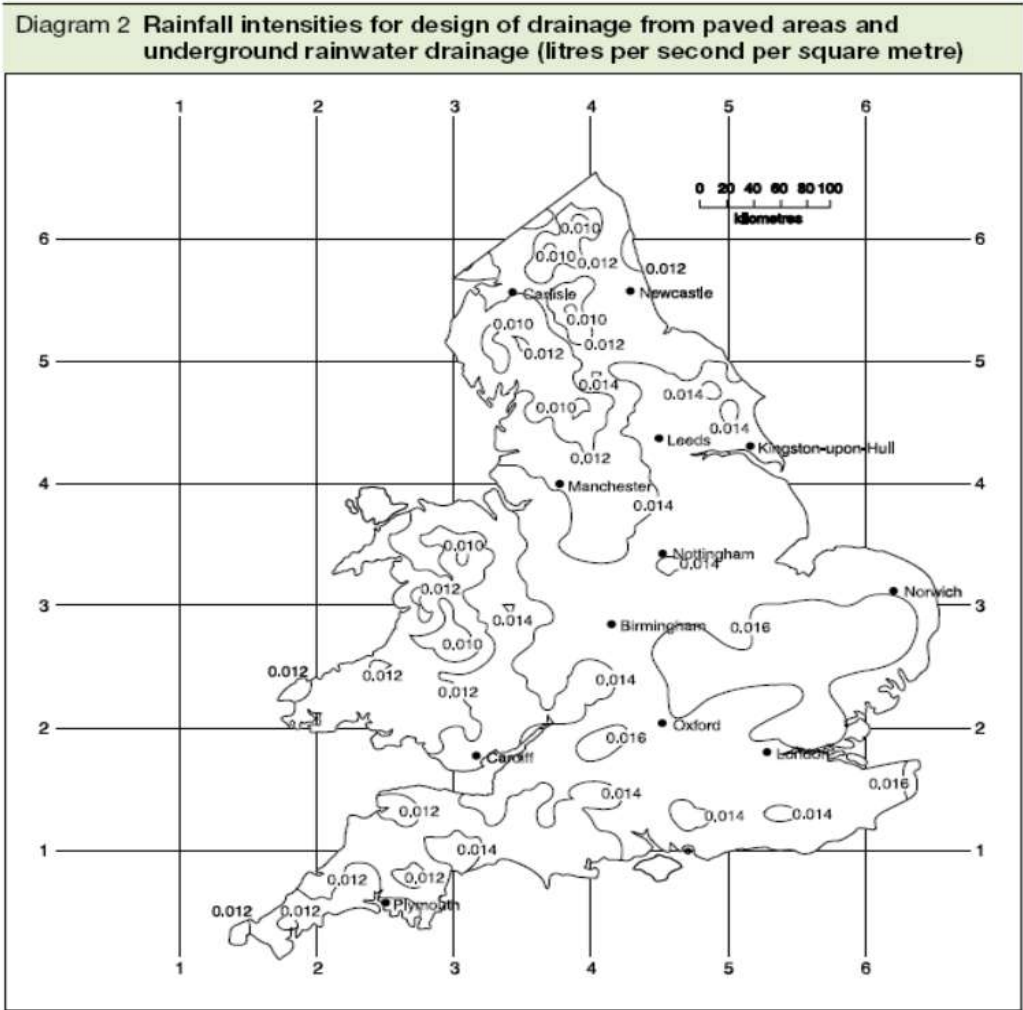
Part	Storm Water - Main Roof Drainage UNIT A
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REF	Design minimum gradient = 1:200 Minimum pipe diameter = 100 mm	OUTPUT
Diagram 3 Discharge capacities of rainwater drains running full		
H3 Diag. 3 Capacity of 100 mm diameter pipe at 1:200 gradient = 4.2 l/s > 3.43 l/s O.K.		

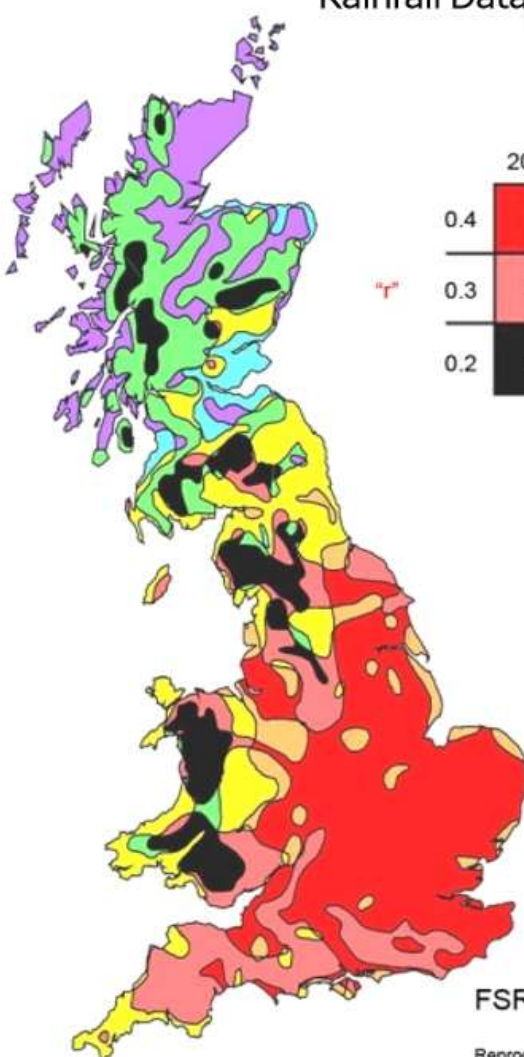
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Part	Storm Water - Paved Areas UNIT A
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REF		OUTPUT
Part H3	Rainfall Intensity = 0.012 l/s/m ²	
Diagram 2		



H3	Total Patio	=	0	m2
	Total Driveway	=	0	m2
	Total Other	=	0	m2
	Total Hardstanding Area	=	0	m ²

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Part Rainfall Data Map																								
REF <u>U.K. Rainfall Intensity Data - HR Wallingford Map</u> OUTPUT Rainfall Data  M_60 r <table border="1" style="border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>20mm</th> <th>17mm</th> <th>14mm</th> </tr> </thead> <tbody> <tr> <th>0.4</th> <td style="background-color: red; color: white;">1</td> <td style="background-color: orange;">4</td> <td style="background-color: white; border: 1px solid black;">X</td> </tr> <tr> <th>0.3</th> <td style="background-color: pink;">2</td> <td style="background-color: yellow;">5</td> <td style="background-color: cyan;">7</td> </tr> <tr> <th>0.2</th> <td style="background-color: black; color: white;">3</td> <td style="background-color: green;">6</td> <td style="background-color: purple;">8</td> </tr> </tbody> </table> FSR M 60 + "r" parameters Reproduced with permission from H.R. Wallingford Area no. = 5										20mm	17mm	14mm	0.4	1	4	X	0.3	2	5	7	0.2	3	6	8
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0.4	1	4	X																					
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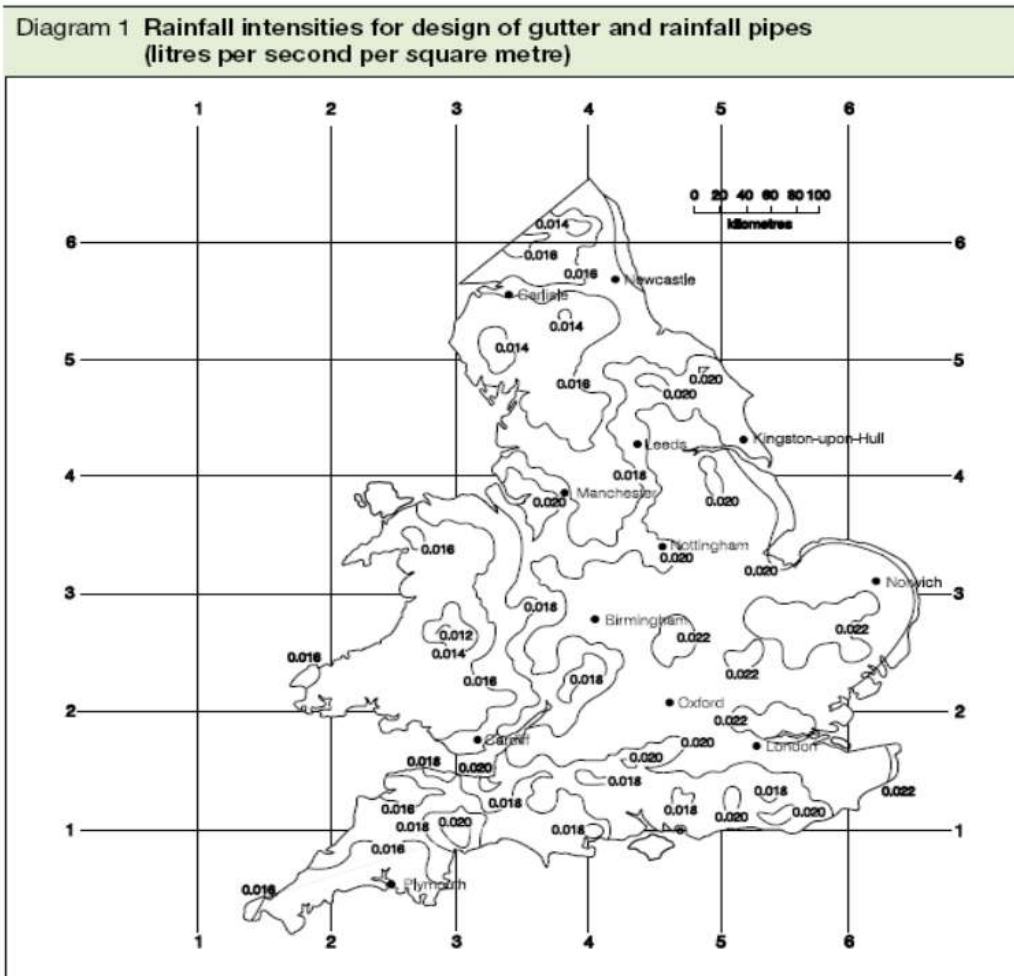
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Part	Storm Water - Roof Drainage UNIT B
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REF	OUTPUT
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Part H3 Rainfal Intensity = 0.014 l/s/m²

Diagram 1



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Part

Storm Water - Roof Drainage UNIT B

REF
 H3.CI 1.3,

Gutter Design (Main Roof)				Gutter Design (Other Roofed Areas)			
Roof Area	=	216	m ²	Roof Area	=	0	m ²
Roof Pitch	=	15	Degrees	Roof Pitch	=	0	Degrees
Effective Area Factor	=	1.13		Effective Area Factor	=	1.00	
Effective Roof Area	=	244.99	m ²	Effective Roof Area	=	0	m ²

OUTPUT

T1. Part H3

Table 1 Calculation of drained area		
Type of surface	Effective design area	
1 Flat roof	plan area of relevant portion	
2 Pitched roof at 30°	plan area of portion x 1.29	
Pitched roof at 45°	plan area of portion x 1.50	
Pitched roof at 60°	plan area of portion x 1.87	
3 Pitched roof over 70° or any wall	elevational area x 0.5	

unit c 432
 unit b 215
 unit a 216

T2. Part H3

Table 2 Gutter sizes and outlet sizes			
Max. effective roof area (m ²)	Gutter size (mm diam.)	Outlet size (mm diam.)	Flow capacity (litres/sec)
6.0	-	-	-
18.0	75	50	0.38
37.0	100	63	0.78
53.0	115	63	1.11
65.0	125	75	1.37
103.0	150	89	2.16

Note: Refers to nominal half round eaves gutters laid level with outlets at one end sharp edged. Round edged outlets allow smaller downpipe sizes.

Option: Automatic

From Table 2 above provide:

Gutter Size = 125
 No. of RWP's = 4

Maximum effective area served by x1 gutter & RWP = 61.2468 m²
 Max allowable effective area = 65 m² > 61.2468 m² **OK**

H3. CI.1.10 Provide minimum 125 mm gutters with 75 mm diameter downpipes.

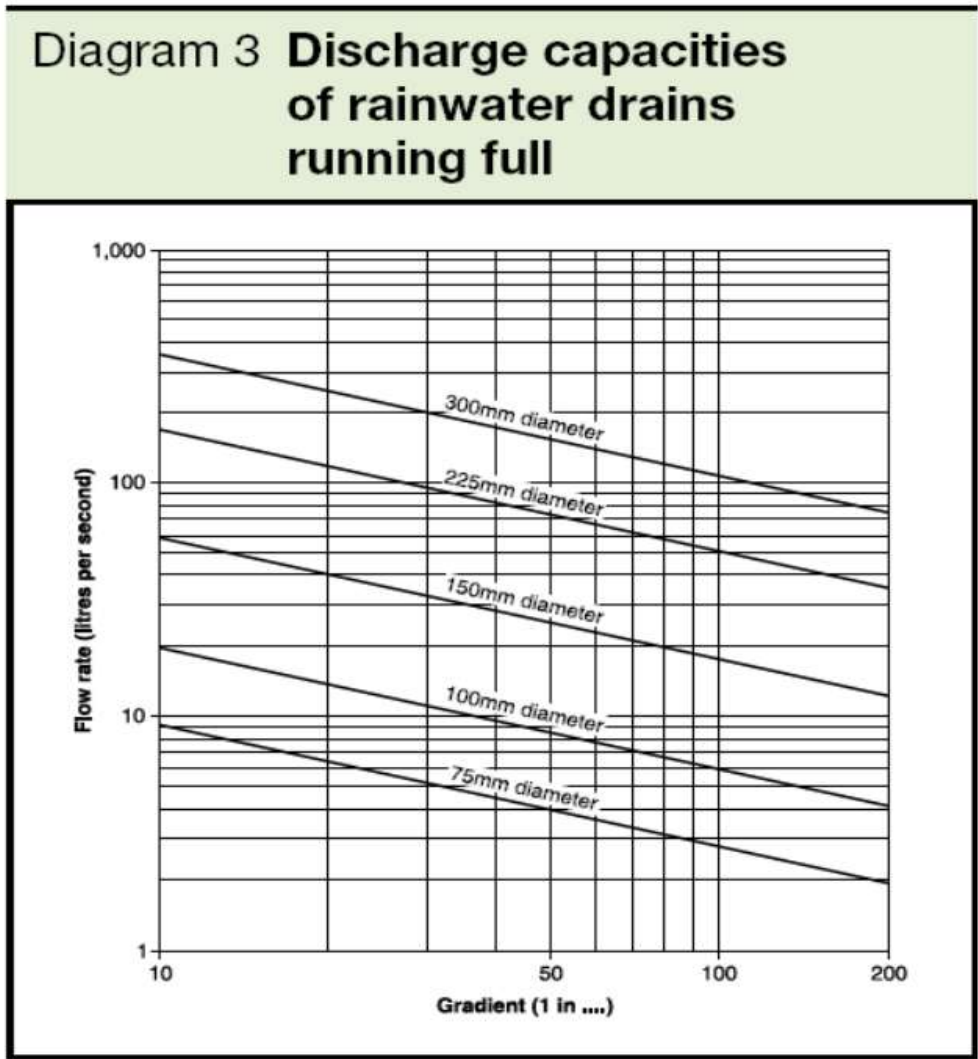
Total Roof Discharge Flow Rate = 3.43 l/s per dwelling

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Part

Storm Water - Main Roof Drainage UNIT B

REF	Design minimum gradient = 1:200 Minimum pipe diameter = 100 mm	OUTPUT
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H3 Diag. 3 Capacity of 100 mm diameter pipe at 1:200 gradient = 4.2 l/s > 3.43 l/s **O.K.**

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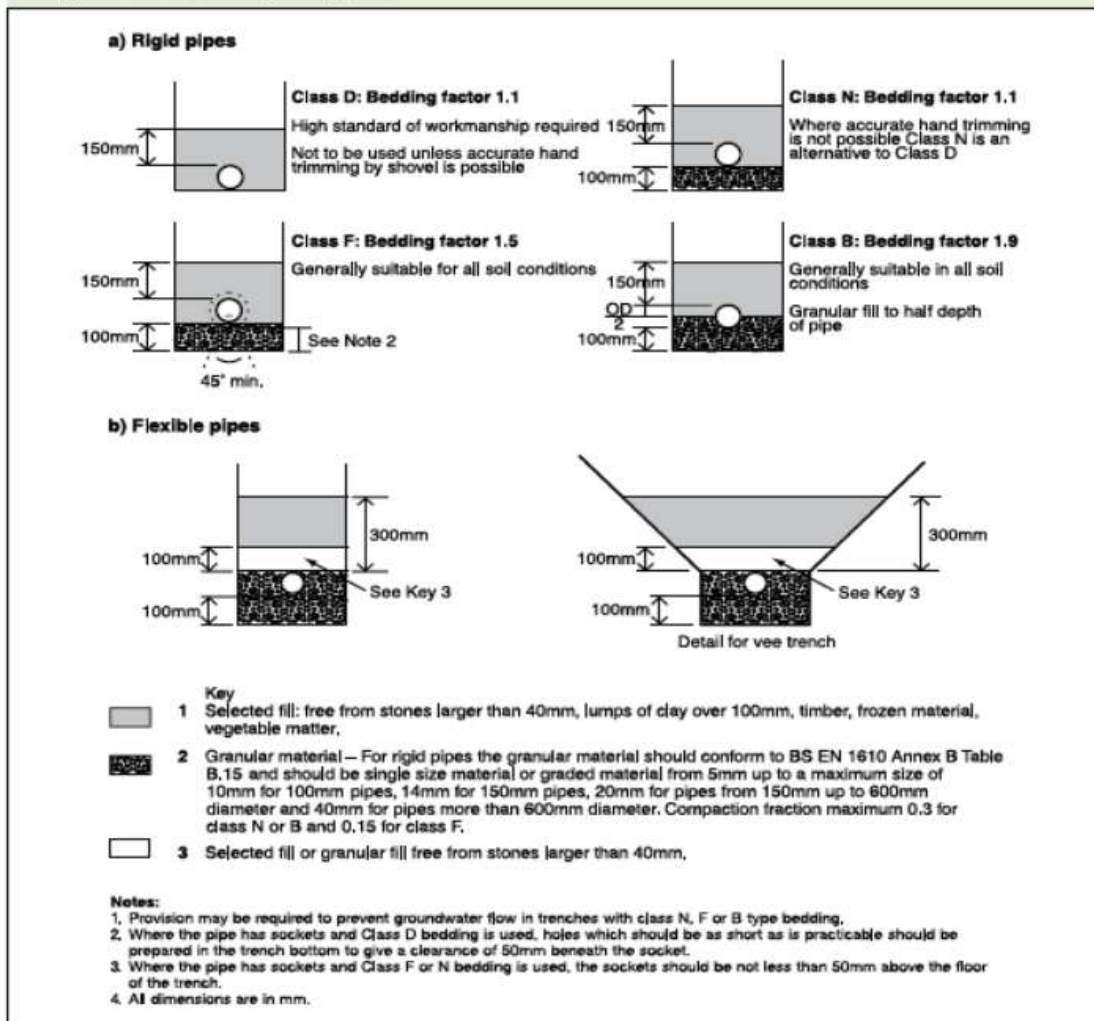
Storm Water - Roof Drainage UNIT B

REF

OUTPUT

Pipe Bedding Material as per recommendation H1 clause 2.41 - 2.45

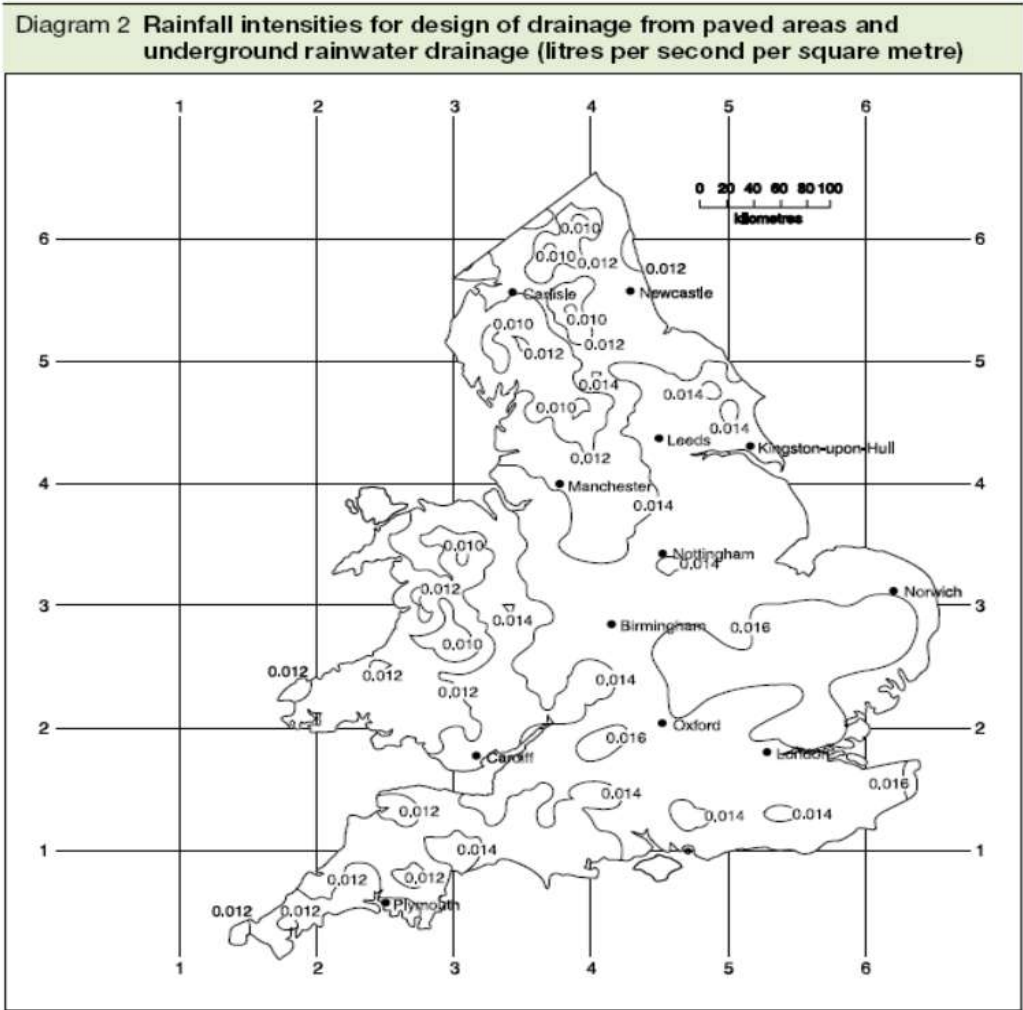
Diagram 10 Bedding for pipes



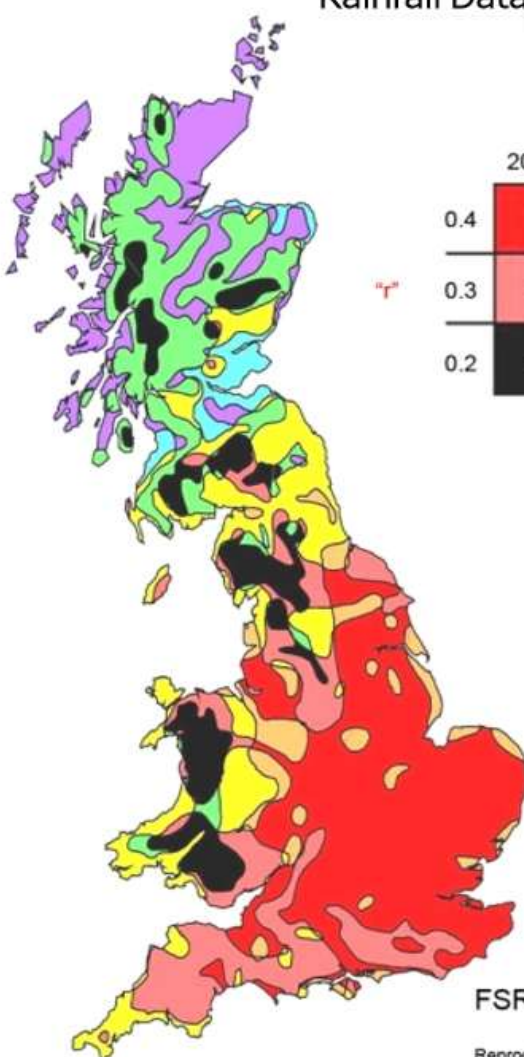
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Part	Storm Water - Paved Areas UNIT B
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REF		OUTPUT
Part H3	Rainfall Intensity = 0.012 l/s/m ²	
Diagram 2		



H3	Total Patio	=	0	m2
	Total Driveway	=	0	m2
	Total Other	=	0	m2
	Total Hardstanding Area	=	0	m ²

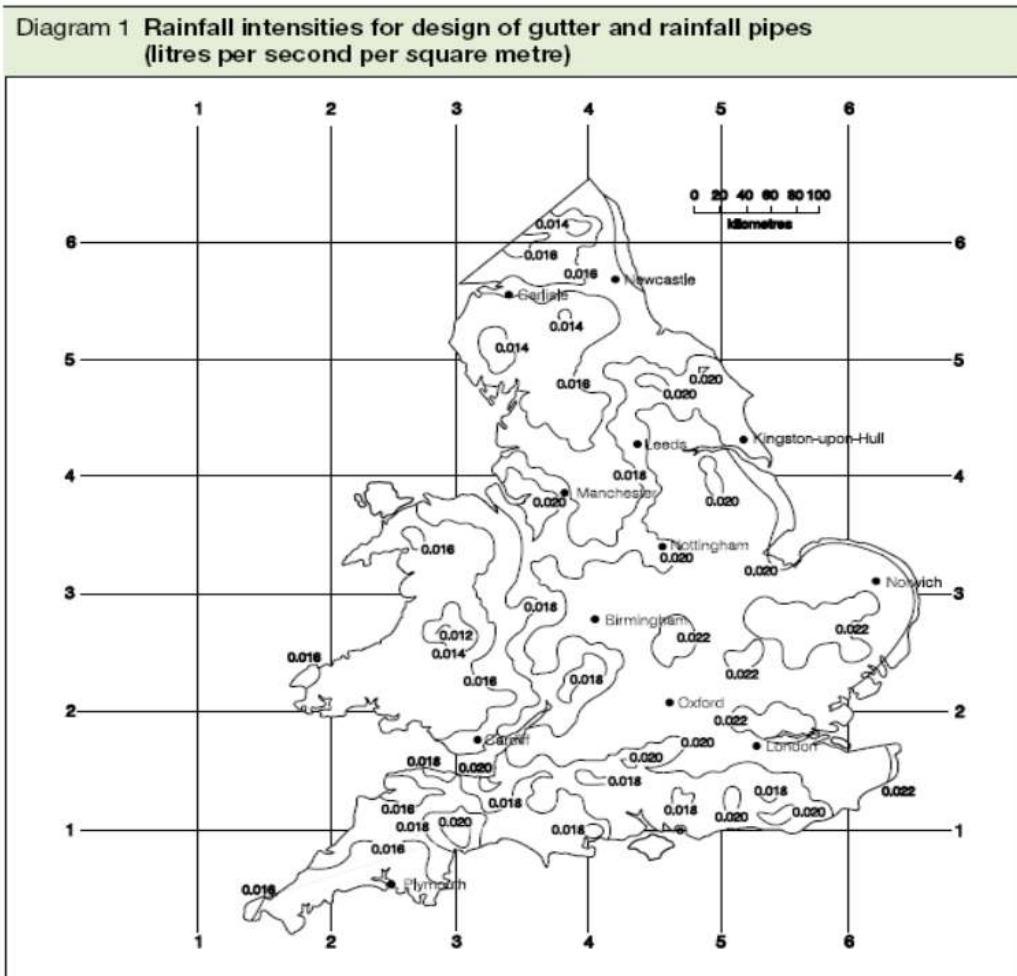
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0.4	1	4	X																									
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Part	Storm Water - Roof Drainage UNIT C
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REF	OUTPUT
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Part H3 Rainfal Intensity = 0.014 l/s/m²
Diagram 1



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Part

Storm Water - Roof Drainage UNIT C

REF
 H3.CI 1.3,

Gutter Design (Main Roof)	Gutter Design (Other Roofed Areas)
Roof Area = 40 m ²	Roof Area = 0 m ²
Roof Pitch = 15 Degrees	Roof Pitch = 0 Degrees
Effective Area Factor = 1.13	Effective Area Factor = 1.00
Effective Roof Area = 45.368 m ²	Effective Roof Area = 0 m ²

OUTPUT

T1. Part H3

Table 1 Calculation of drained area	
Type of surface	Effective design area
1 Flat roof	plan area of relevant portion
2 Pitched roof at 30° Pitched roof at 45° Pitched roof at 60°	plan area of portion x 1.29 plan area of portion x 1.50 plan area of portion x 1.87
3 Pitched roof over 70° or any wall	elevational area x 0.5

unit c 432
 unit b 215
 unit a 216

T2. Part H3

Table 2 Gutter sizes and outlet sizes			
Max. effective roof area (m ²)	Gutter size (mm diam.)	Outlet size (mm diam.)	Flow capacity (litres/sec)
6.0	-	-	-
18.0	75	50	0.38
37.0	100	63	0.78
53.0	115	63	1.11
65.0	125	75	1.37
103.0	150	89	2.16

Note: Refers to nominal half round eaves gutters laid level with outlets at one end sharp edged. Round edged outlets allow smaller downpipe sizes.

Option: Automatic

From Table 2 above provide:

Gutter Size = 115

No. of RWPs = 1

Maximum effective area served by x1 gutter & RWP
 Max allowable effective area = 53 m²

= 45.368 m²
 > 45.368 m² **OK**

H3. CI.1.10

Provide minimum 115 mm gutters with 63 mm diameter downpipes.

Total Roof Discharge Flow Rate
 per dwelling

= 0.64 l/s

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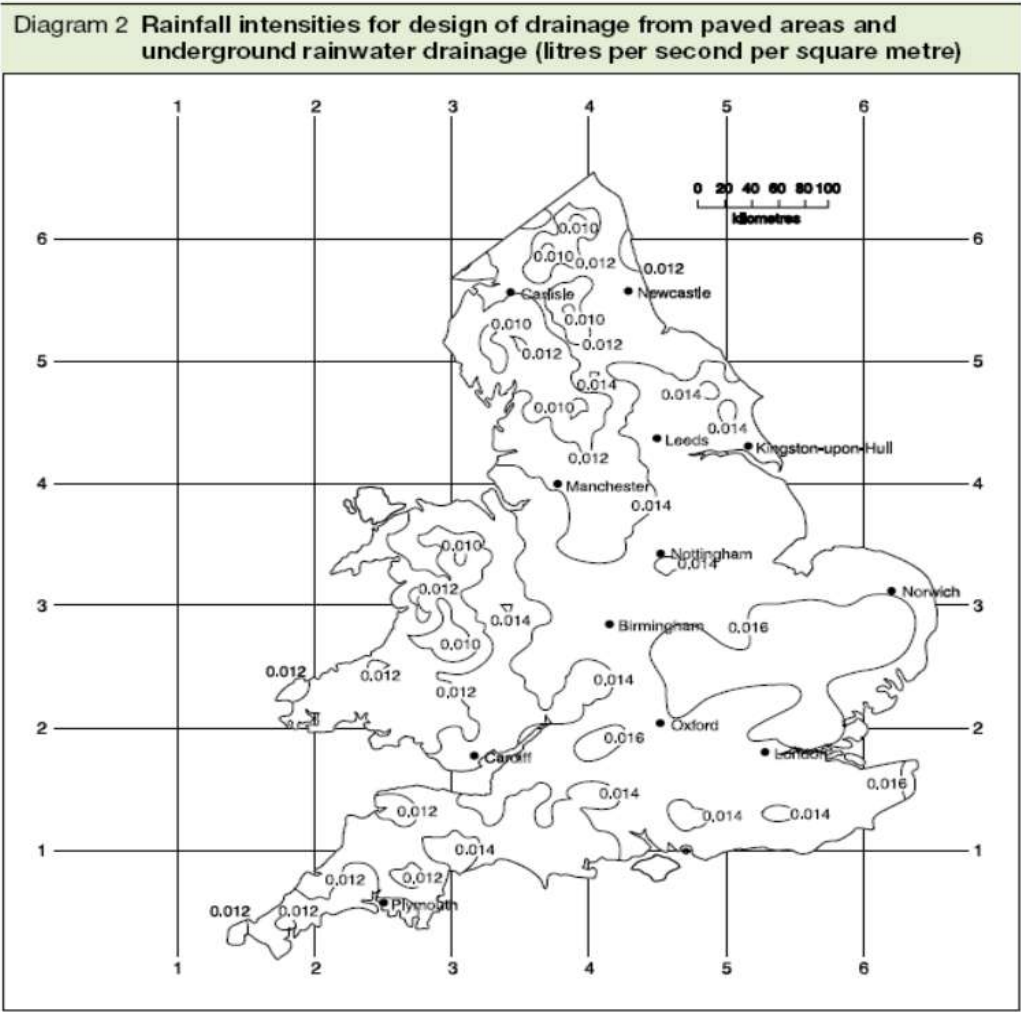
Part	Storm Water - Main Roof Drainage UNIT C
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REF	Design minimum gradient = 1:200 Minimum pipe diameter = 75 mm	OUTPUT
Diagram 3 Discharge capacities of rainwater drains running full Diagram 3 Capacity of 75 mm diameter pipe at 1:200 gradient = 2.0 l/s > 0.635 l/s Minimum pipe diameter to be used = 100mm for connection requirements		
H3 Diag. 3 Capacity of 75 mm diameter pipe at 1:200 gradient = 2.0 l/s > 0.635 l/s Minimum pipe diameter to be used = 100mm for connection requirements O.K.		

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Rev	Date	Details				
						Tel: 01792 805010

Part	Storm Water - Paved Areas UNIT C
------	----------------------------------

REF		OUTPUT
Part H3	Rainfall Intensity = 0.012 l/s/m ²	
Diagram 2		



H3	Total Patio	=	0	m2
	Total Driveway	=	0	m2
	Total Other	=	0	m2
	Total Hardstanding Area	=	0	m ²

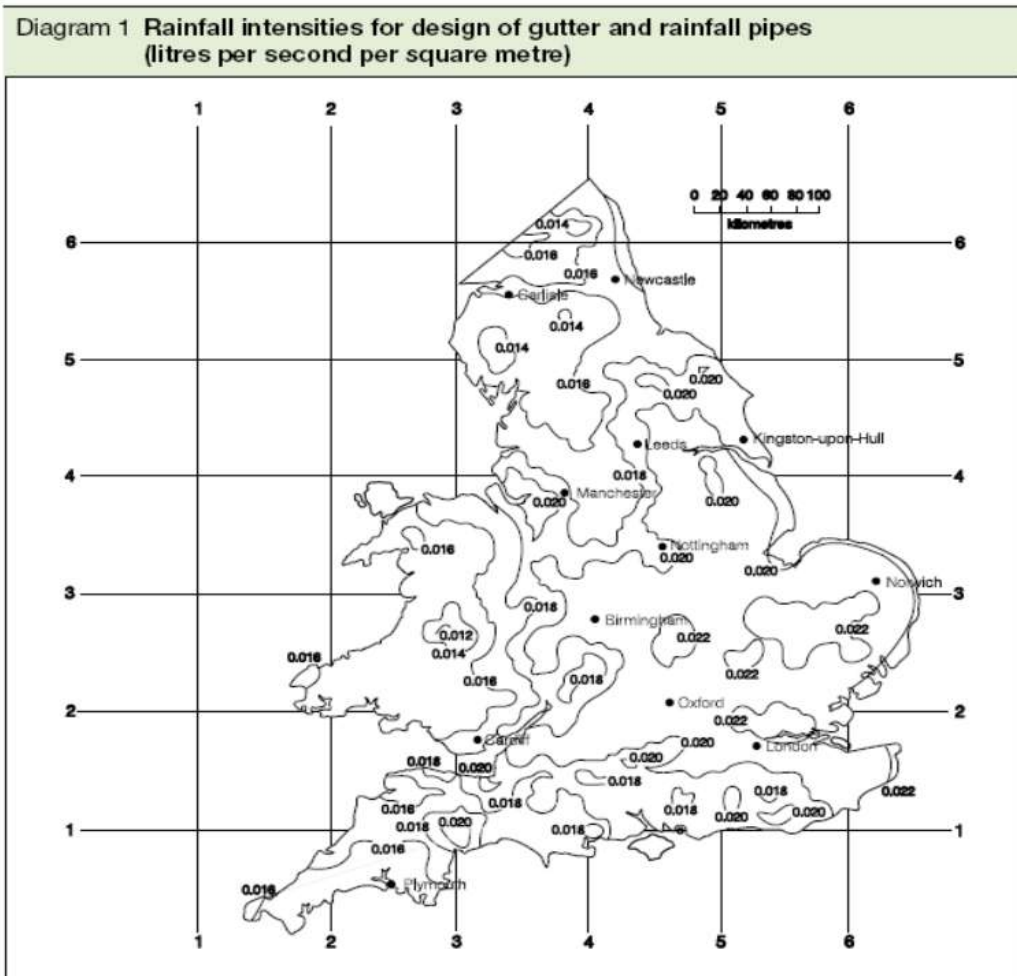
Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD Canolfan Gorseion Centre Millers Drive Gorseionon SA4 4QN Tel: 01792 805010
Date	May-26	Job no.	Section	Sheet no.	Rev	
By	RD	1841	C&S	SW / 19	C01	
Checked	IH					
Rev	Date	Details				

Part	Storm Water - Roof Drainage AGRI UNIT
------	---------------------------------------

REF	OUTPUT
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Part H3 Rainfal Intensity = 0.014 l/s/m²

Diagram 1



Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD Canolfan Gorseion Centre Millers Drive Gorseionon SA4 4QN Tel: 01792 805010			
Date May-26 By RD Checked IH		Job no. 1841		Section C&S		Sheet no. SW / 20		Rev C01	
Rev		Date		Details				Tel: 01792 805010	

Part

Storm Water - Roof Drainage AGRI UNIT

REF
OUTPUT

H3.CI 1.3, **Gutter Design (Main Roof)**

Roof Area	=	432	m ²
Roof Pitch	=	15	Degrees
Effective Area Factor	=	1.13	
Effective Roof Area	=	489.97	m ²

Gutter Design (Other Roofed Areas)

Roof Area	=	0	m ²
Roof Pitch	=	0	Degrees
Effective Area Factor	=	1.00	
Effective Roof Area	=	0	m ²

T1. Part H3

Table 1 Calculation of drained area		
Type of surface	Effective design area	
1 Flat roof	plan area of relevant portion	
2 Pitched roof at 30° Pitched roof at 45° Pitched roof at 60°	plan area of portion x 1.29 plan area of portion x 1.50 plan area of portion x 1.87	
3 Pitched roof over 70° or any wall	elevational area x 0.5	

unit c 432
unit b 215
unit a 216

T2. Part H3

Table 2 Gutter sizes and outlet sizes			
Max. effective roof area (m ²)	Gutter size (mm diam.)	Outlet size (mm diam.)	Flow capacity (litres/sec)
6.0	-	-	-
18.0	75	50	0.38
37.0	100	63	0.78
53.0	115	63	1.11
65.0	125	75	1.37
103.0	150	89	2.16

Note: Refers to nominal half round eaves gutters laid level with outlets at one end sharp edged. Round edged outlets allow smaller downpipe sizes.

Option: Automatic

From Table 2 above provide:

Gutter Size = 150
No. of RWP's = 5

Maximum effective area served by x1 gutter & RWP = 97.99488 m²
 Max allowable effective area = 103 m² > 97.99488 m² **OK**

H3. CI.1.10 Provide minimum 150 mm gutters with 89 mm diameter downpipes.

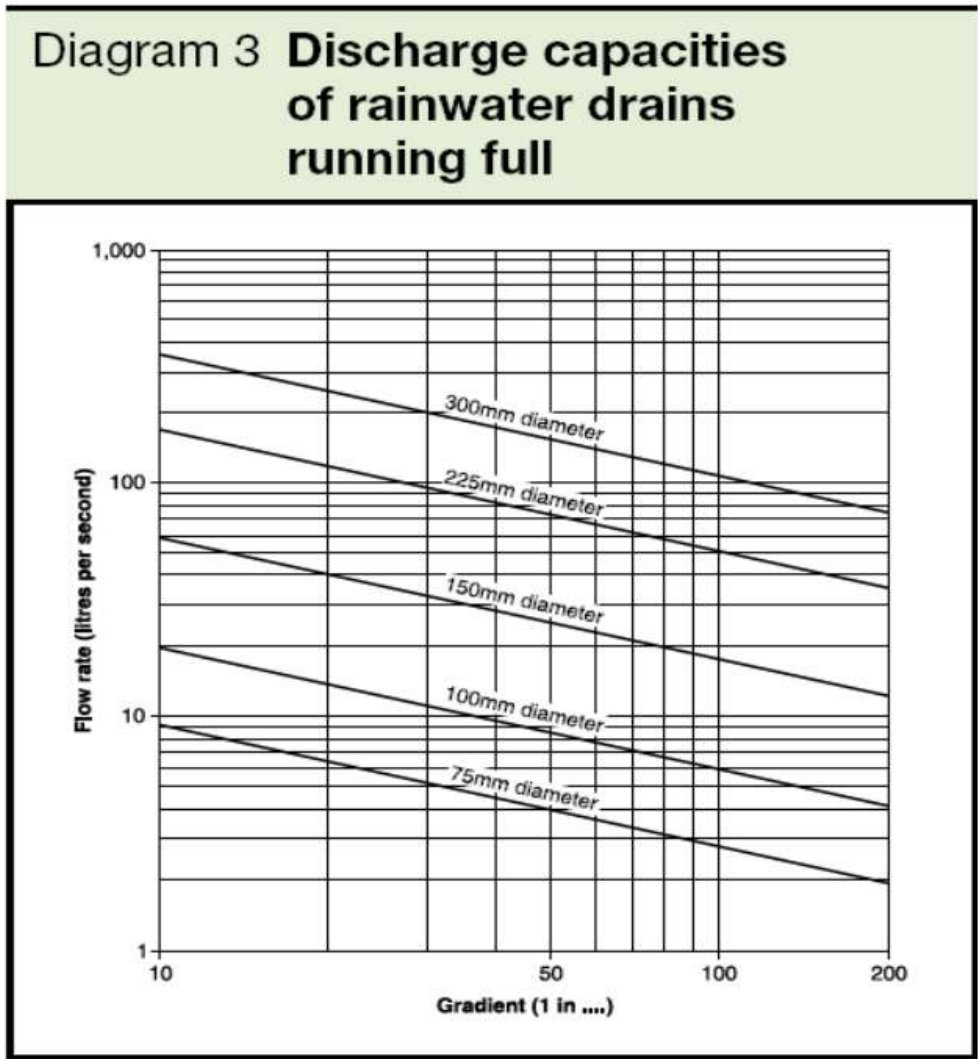
Total Roof Discharge Flow Rate per dwelling = 6.86 l/s

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD Canolfan Gorseion Centre Millers Drive Gorseionon SA4 4QN Tel: 01792 805010
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Rev	Date	Details				

Part

Storm Water - Main Roof Drainage AGRI UNIT

REF	Design minimum gradient = 1:200 Minimum pipe diameter = 150 mm	OUTPUT
-----	--	--------



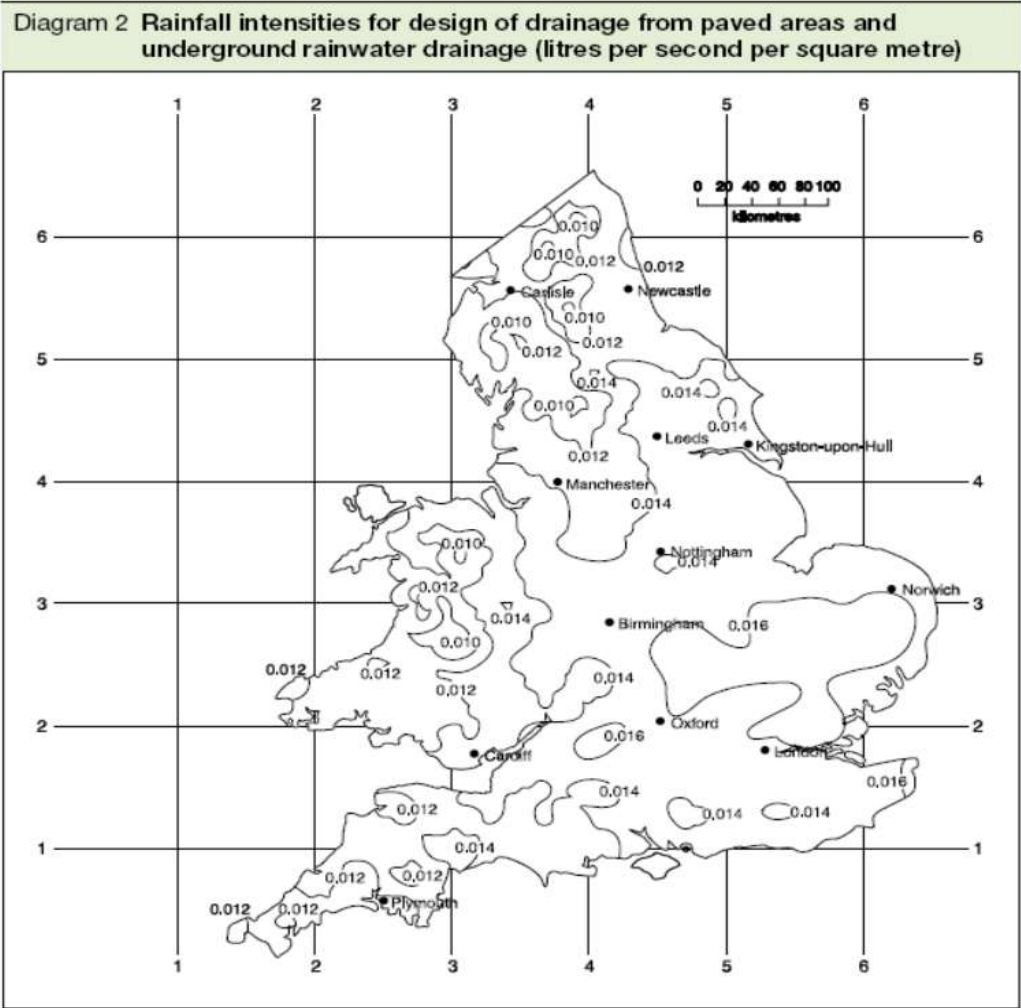
H3 Diag. 3 Capacity of 150 mm diameter pipe at 1:200 gradient = 13.5 l/s > 6.86 l/s **O.K.**

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Checked	IH					
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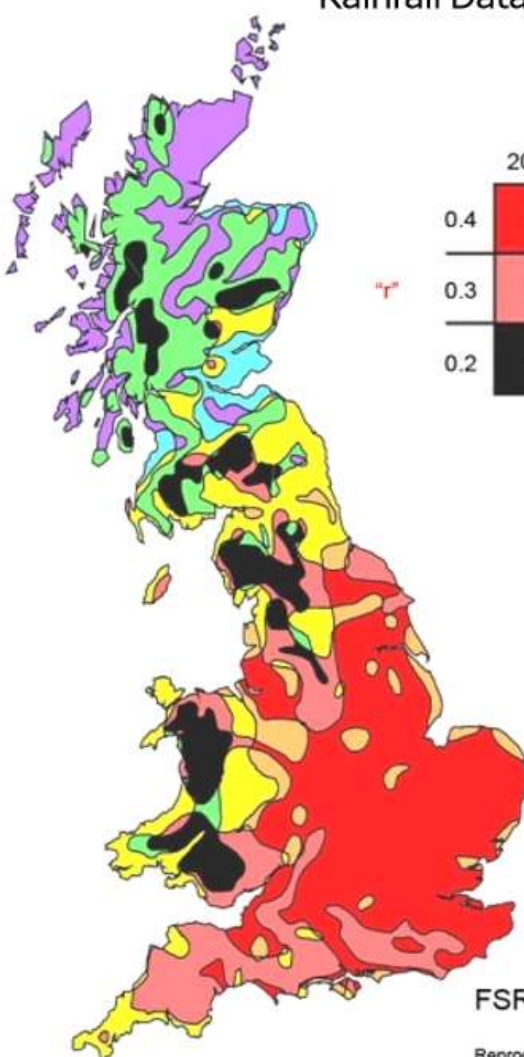
Part

Storm Water - Paved Areas AGRI UNIT

REF		OUTPUT
Part H3	Rainfal Intensity = 0.012 l/s/m ²	
Diagram 2		



H3	Total Patio	=	0	m2
	Total Driveway	=	0	m2
	Total Other	=	0	m2
	Total Hardstanding Area	=	0	m ²

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD Canolfan Gorseion Centre Millers Drive Gorseionon SA4 4QN																						
Date May-26		Job no. 1841		Section C&S		Sheet no. SW / 24		Rev C01																				
By RD																												
Checked IH																												
Rev	Date	Details						Tel: 01792 805010																				
Part Rainfall Data Map																												
REF <u>U.K. Rainfall Intensity Data - HR Wallingford Map</u> OUTPUT Rainfall Data  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th colspan="3">M_s 60</th> </tr> <tr> <th></th> <th>20mm</th> <th>17mm</th> <th>14mm</th> </tr> </thead> <tbody> <tr> <th>0.4</th> <td style="background-color: red; color: white; text-align: center;">1</td> <td style="background-color: orange; color: black; text-align: center;">4</td> <td style="text-align: center;">X</td> </tr> <tr> <th>0.3</th> <td style="background-color: pink; color: black; text-align: center;">2</td> <td style="background-color: yellow; color: black; text-align: center;">5</td> <td style="background-color: cyan; color: black; text-align: center;">7</td> </tr> <tr> <th>0.2</th> <td style="background-color: black; color: white; text-align: center;">3</td> <td style="background-color: green; color: black; text-align: center;">6</td> <td style="background-color: purple; color: white; text-align: center;">8</td> </tr> </tbody> </table> FSR M 60 + "r" parameters Reproduced with permission from H.R. Wallingford Area no. = 5										M _s 60				20mm	17mm	14mm	0.4	1	4	X	0.3	2	5	7	0.2	3	6	8
	M _s 60																											
	20mm	17mm	14mm																									
0.4	1	4	X																									
0.3	2	5	7																									
0.2	3	6	8																									

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD	
Date May-26		Job no. 1841		Section C&S		Sheet no. IN/ 1	
By RD				Rev C01		Canolfan Gorseion Centre Millers Drive Gorseionon SA4 4QN	
Checked IH							
Rev		Date		Details		Tel: 01792 805010	
Part		Interception Compliance: Main Roof					
REF		OUTPUT					
<u>Sustainable Drainage Systems Standards for Wales</u>							
As per the Statutory standards for sustainable drainage systems - <i>designing, constructing, operating and maintaining surface water drainage systems 2018</i> , interception of the first 5mm rainfall is expected to be delivered on a probabilistic basis for all new developments. (80% of Summer & 20% of Winter Storm Events)							
SC/01		All storm water managed at priority level 2 <i>(Infiltration)</i> Interception is deemed fully compliant for 80% Summer & 50% Winter storms					
TABLE G2.1		Refer to table G2.1 Interception mechanisms with assumed compliance					
<u>TREATMENT TRAIN 1: Main Roof Runoff</u>							
Area of Main Roof = 1025m2							
Interception System (Feature 1): Bioretention Areas and Rainwater Gardens/ Planters Intercepting Area = 4.2m2 Additional Interception Features are to be Provided for Compliance Additional area required for interception =1004m2							
Interception System (Feature 2): Detention Basin Intercepting Area = 150m2 Interception compliance achieved for Main Roof runoff							
DETENTION BASIN CANNOT HAVE PERMANENT WATER LEVEL TO COMPLY WITH INTERCEPTION CRITERIA							

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD Canolfan Gorseionon Centre Millers Drive Gorseionon. SA4 8BW	
Date May-26 By RD Checked IH		Job no. 1841	Section C&S	Sheet no. GF / 1	Rev C01	Tel: 01792 805010	
Rev	Date	Details					

Part

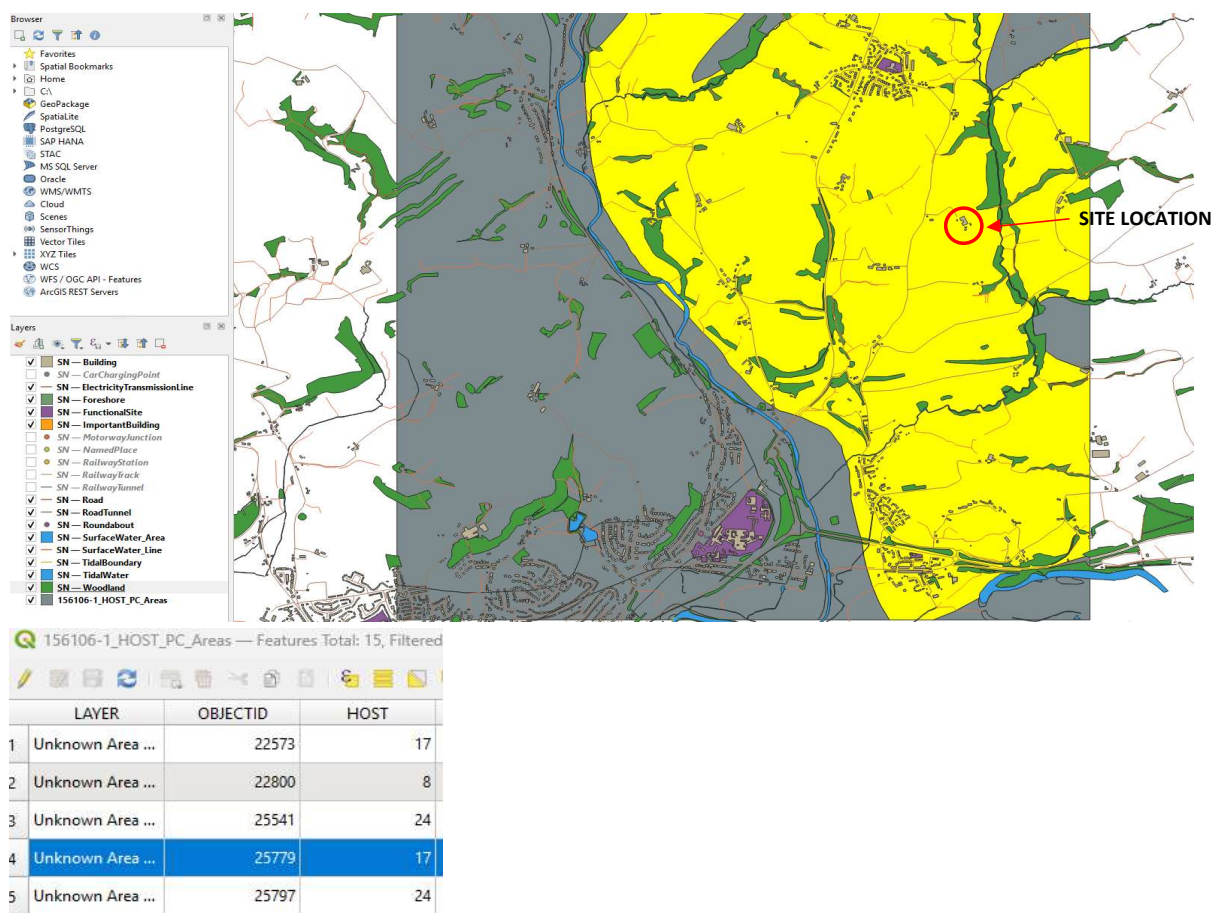
HR Wallingford Greenfield Run-Off Estimate

REF

OUTPUT

Location of site: Marcholws, Peniel Carmarthenshire SA32 7AA,
 X (Easting)
 Y (Northing)
 OS Grid Reference:

QGIS HOST Map Analysis



Highlighted HOST layer denoted by **YELLOW** area in QGIS map
 HOST Classification: **17**

Revising the BFIHOST catchment descriptor to improve UK flood frequency estimates 2019

BFI HOST (Beta 22 Class + weighted) = **0.514**

Catchment area sent to vortex flow control discharge = 1025 m²
 = 0.1025 ha

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD Canolfan Gorseinon Centre Millers Drive Gorseinon. SA4 8BW Tel: 01792 805010
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Part

HR Wallingford Greenfield Run-Off Estimate

REF

OUTPUT



Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	11/05/2026
Calculated by	RD
Reference	1841
Model version	2.2.3

Location

Site name	Peniel
Site location	Peniel



Site easting (British National Grid)	244119
Site northing (British National Grid)	223226

Site details

Total site area (ha)	0.1025	ha
----------------------	--------	----

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD Canolfan Gorseinon Centre Millers Drive Gorseinon. SA4 8BW Tel: 01792 805010
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Rev	Date	Details				

Part

HR Wallingford Greenfield Run-Off Estimate

REF	OUTPUT
-----	--------

Greenfield runoff

Method

Method

FEH statistical (2008)

FEH statistical (2008)

SAAR6190 (mm)

1500

mm

BFIHOST19

0.514

QMed-QBar conversion

1.075

☐

1.075

QMed (l/s)

1.2

l/s

QBar (FEH statistical 2008) (l/s)

1.3

l/s

Growth curve factors

Hydrological region

9

☐

9

1 year growth factor

0.88

2 year growth factor

0.93

10 year growth factor

1.42

30 year growth factor

1.78

100 year growth factor

2.18

200 year growth factor

2.46

Results

Method

FEH statistical (2008)

Flow rate 1 year (l/s)

1.1

l/s

Flow rate 2 year (l/s)

1.2

l/s

Flow rate 10 years (l/s)

1.8

l/s

Flow rate 30 years (l/s)

2.3

l/s

Flow rate 100 years (l/s)

2.8

l/s

Flow rate 200 years (l/s)

3.2

l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at [uksuds.com](https://www.uksuds.com/) (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosciences or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD
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						Canolfan Gorseion Centre Millers Drive Gorseinon SA4 4QN
Rev	Date	Details				Tel: 01792 805010
Part Flow Control Calculations						
REF						OUTPUT
Calculations & Details For Hydrobrake Flow Control Devices						

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD	
Date May-26		Job no. 1841		Section C&S		Canolfan Gorseion Centre Millers Drive Gorseion. SA4 8BW	
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Part

Flow Control Calculations

REF

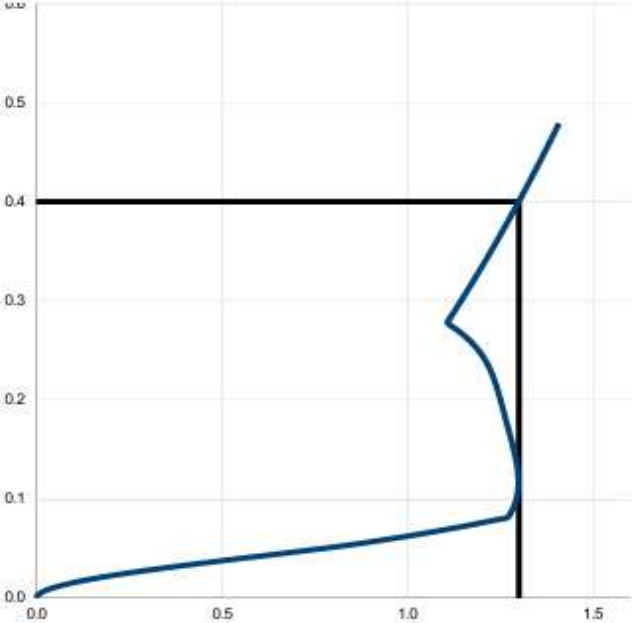
OUTPUT

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.400	1.300
Flush-Flo™	0.117	1.299
Kick-Flo®	0.277	1.105
Mean Flow		1.102



hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.014	0.081
0.028	0.295
0.041	0.586
0.055	0.877
0.069	1.103
0.083	1.274
0.097	1.291
0.110	1.298
0.124	1.298
0.138	1.293
0.152	1.285
0.166	1.275
0.179	1.265
0.193	1.256
0.207	1.245
0.221	1.233
0.234	1.218
0.248	1.195
0.262	1.161
0.276	1.113
0.290	1.127
0.303	1.150
0.317	1.173
0.331	1.195
0.345	1.217
0.359	1.238
0.372	1.259
0.386	1.279
0.400	1.300

DESIGN
ADVICE

!

The head/flow characteristics of this SHE-0062-1300-0400-1300 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.



SHE-0062-1300-0400-1300

Hydro-Brake® Optimum

DATE

11/05/2026 09:27

Site

Peniel

DESIGNER

Ross Duncan

Ref

1841

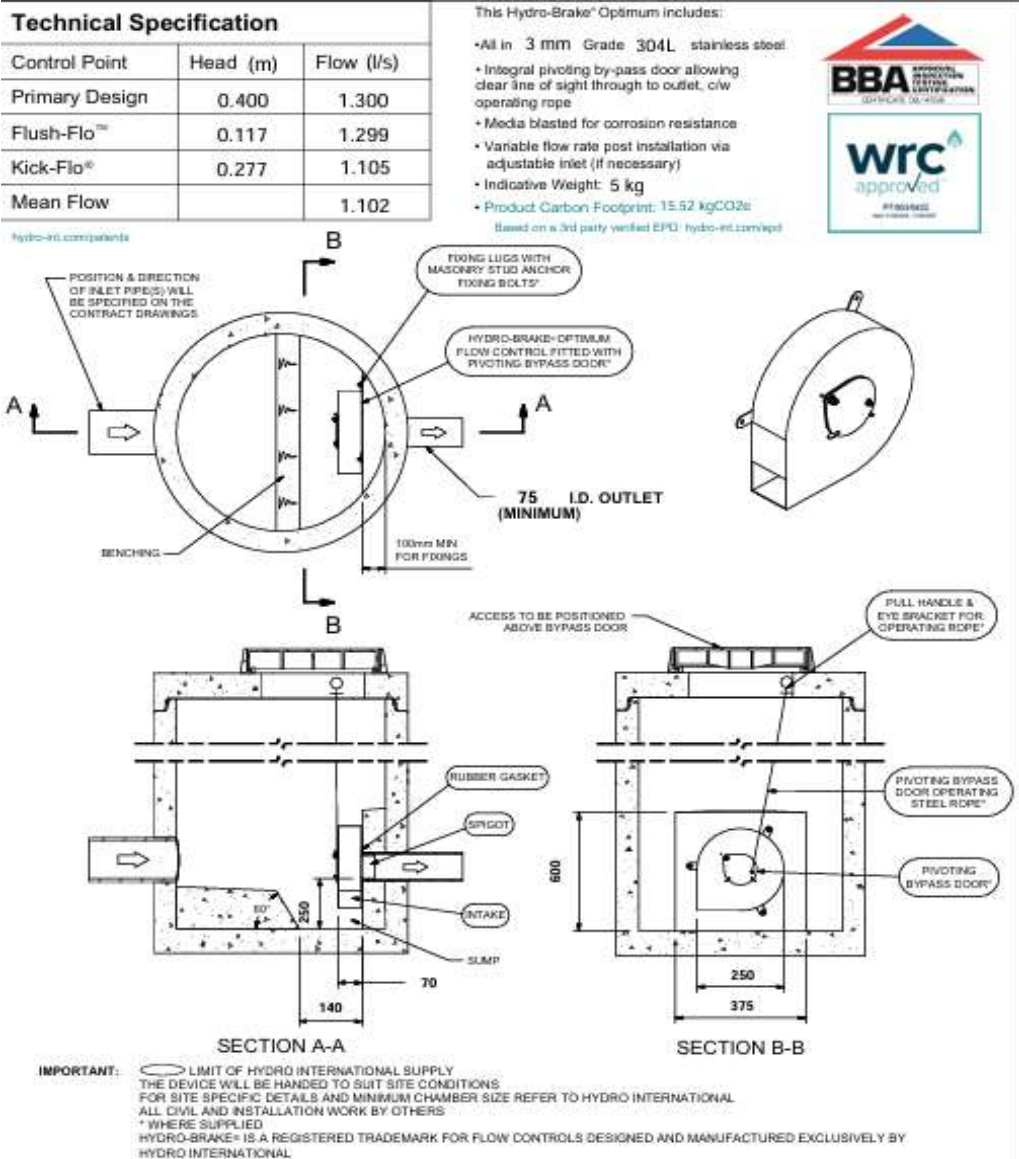
© 2024 Hydro International, Rivermead Court, Kern Business Park, Windmill Road, Kern, Clevedon, BS21 6FT. Tel 01275 878371 Fax 01275 874079 Web www.hydro-int.com Email design@hydro-int.com

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,					Document Number HCE-1841-CVD-CAL-001		HCE LTD Canolfan Gorseinon Centre Millers Drive Gorseinon. SA4 8BW Tel: 01792 805010
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By RD							
Checked IH							
Rev	Date	Details					

Part

Flow Control Device Details

REF	OUTPUT
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THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE !	The head/flow characteristics of this SHE-0062-1300-0400-1300 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve. The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.		Hydro International A CRH COMPANY
	DATE	11/05/2026 09:27	
	SITE	Peniel	
	DESIGNER	Ross Duncan	
	REF	1841	
		SHE-0062-1300-0400-1300	Hydro-Brake® Optimum

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,					Document Number HCE-1841-CVD-CAL-001		HCE LTD		
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By RD								Canolfan Gorseion Centre Millers Drive Gorseion SA4 4QN	
Checked IH									
Rev		Date		Details				Tel: 01792 805010	

Part

Attenuation System Sizing for Total Roof

REF

OUTPUT

Site & Environmental Data		
Catchment Name	Total Roof	
Run off Area m ²	1025.0	
Area Reduction Factor	0.85	
Material Absorption	15%	
System Usage	Attenuation	
Climate Change	30%	
Effective Area m ²	1133	
Additional Inflow?	No	
Type of Traffic	Pedestrian	
Rainfall Data		
R Value	0.3	
M5-60	17	
Storm Return Period	1 in 100 years	
ATTENUATION TYPE	Basin	
Additional Attenuation	No	0

Storm Duration	M5-60 Z1	M5-60 y mm	M100-60 Z2 Value	M100-60 p mm	M100-60 Inflow	Extra Inflow
5min	0.34	5.78	1.79	10.35	11.72	0.00
10min	0.49	8.33	1.86	15.49	17.55	0.00
15min	0.59	10.03	1.91	19.16	21.70	0.00
30min	0.77	13.09	1.91	25.00	28.32	0.00
1hr	1	17	1.99	33.83	38.32	0.00
2hr	1.25	21.25	2.03	43.14	48.86	0.00
4hr	1.57	26.69	2.01	53.65	60.76	0.00
6hr	1.78	30.26	1.97	59.61	67.52	0.00
10hr	2.12	36.04	1.97	71.00	80.42	0.00
24hr	2.84	48.28	1.81	87.39	98.98	0.00
48hr	3.52	59.76	1.81	108.17	122.52	0.00

Attenuation Sizing								
Effec Void	Basin Area at Design Water Lvl (m ²)	Depth (m)	Discharge Rate 'f' (l/s)	Storm (min)	Outflow m ³	Storage Required 'S' (m ³)	Truncated Storage Provided (m ³)	Actual Outflow (m ³)
1.00	150	0.4	1.102	5	0.33	11.39	50.2	0.33
1.00	150	0.4	1.102	10	0.66	16.89	50.2	0.66
1.00	150	0.4	1.102	15	0.99	20.71	50.2	0.99
1.00	150	0.4	1.102	30	1.98	26.33	50.2	1.98
1.00	150	0.4	1.102	60	3.97	34.35	50.2	3.97
1.00	150	0.4	1.102	120	7.93	40.92	50.2	7.93
1.00	150	0.4	1.102	240	15.87	44.89	50.2	15.87
1.00	150	0.4	1.102	360	23.80	43.72	50.2	23.80
1.00	150	0.4	1.102	600	39.67	40.74	50.2	39.67
1.00	150	0.4	1.102	1440	95.21	3.76	50.2	95.21
1.00	150	0.4	1.102	2880	190.43	-67.91	50.2	122.52
Half Emptying Time Ts50 = 0.5S/f = 5.66 hrs						Ts 50 < 24hrs, Therefore Okay		

DISCHARGE NOTES: Rate = 1.10 l/s
Discharge to adjacent watercourse via VFC in PCC chamber.

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Rev	Date	Details				Canolfan Gorseinon Centre Millers Drive Gorseinon. SA4 8BW Tel: 01792 805010
Part Trail Pit Logs & Location Plan						
REF						
OUTPUT						
Trail Pit Logs & Location Plan						

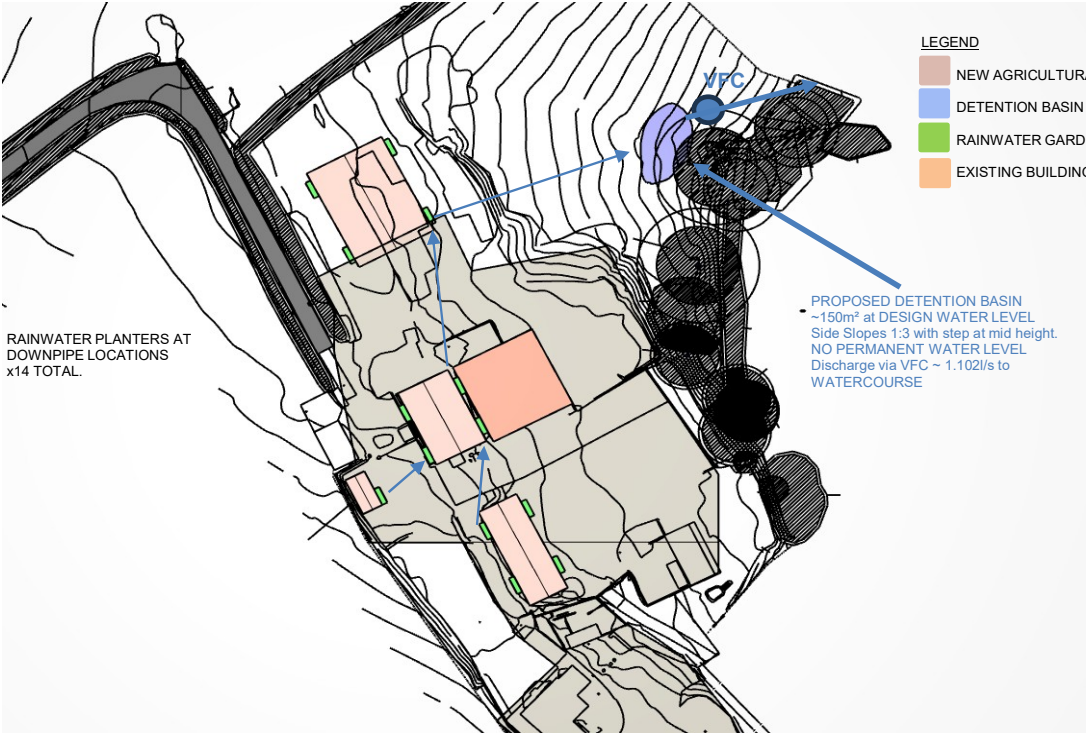
Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,					Document Number HCE-1841-CVD-CAL-001		HCE LTD Canolfan Gorseinon Centre Millers Drive Gorseinon. SA4 8BW			
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By RD										
Checked IH										
Rev	Date	Details							Tel: 01792 805010	

Part

Trail Pit Location Plan

REF

OUTPUT



HCE LTD					Site: Marcholws, Peniel, Carmar		Trial Pit No: TP01		
Excavation Method		Dimensions (m) LG x WD x DP		Ground Level (mOD)		Client:		Job No:	
Tracked Excavator		2.7 x 0.45 x 1.35		-		Mr Alistair & Mrs Anwen Butler		1841	
		Location		Date		Engineer:		Sheet	
		TP01		14/04/2026		Ross Duncan (HCE Limited)		1	
Depth bgl (m)	Sample / Tests	Water Table (m)	Field Records	Level (mOD)	Depth (m) (Th'k)	Description		Legend	
0.15					0	TOP SOIL		Excavated Volume	
						BROWN FIRM SILTY CLAY WITH SOME GRAVEL INCLUSIONS			
0.60					0.5	DARK GREY STIFF SILTY CLAY			
1.00					1	DARK GREY STIFF TO VERY STIFF CLAY WITH ANGULAR ROCK/SHALE FRAGMENTS			
1.35						HEAD OF SHALE LAYER		Pit Depth	
					1.5				
					2				
					2.5				
					3				
					3.5				
TP01 Site Photo					Remarks				
					1. Water Table NOT Encountered 2. Sidewalls remained stable throughout. 3. Trail pit aborted on HCE Engineer's instruction at -1.35m due to Inpenetrable shale layer 4. Soakaway test conducted in accordance with BRE Digest 365 at 9.55. Soakaway test completed at 12:00 5. Trail pit backfilled with arisings.				
Scale		Logged By			Figure No.				
NTS		Ross Duncan (HCE Limited)			TP01				

HCE LTD					Site: Marcholws, Peniel, Carmar		Trial Pit No: TP01		
Excavation Method		Dimensions (m) LG x WD x DP		Ground Level (mOD)		Client:		Job No:	
Tracked Excavator		2.4 x 0.45 x 0.55		-		Mr Alistair & Mrs Anwen Butler		1841	
		Location		Date		Engineer:		Sheet	
		TP01		14/04/2026		Ross Duncan (HCE Limited)		1	
Depth bgl (m)	Sample / Tests	Water Table (m)	Field Records	Level (mOD)	Depth (m) (Th'k)	Description		Legend	
0.15					0	TOP SOIL		Excavated Volume	
0.55					0.5	BROWN FIRM SILTY CLAY WITH SOME GRAVEL INCLUSIONS		Pit Depth	
					1				
					1.5				
					2				
					2.5				
					3				
					3.5				
TP01 Site Photo					Remarks				
					1. Water Table NOT Encountered 2. Sidewalls remained stable throughout. 3. Trail pit aborted on HCE Engineer's instruction at -0.55m due to investigation at shallower depth 4. Soakaway test conducted in accordance with BRE Digest 365 at 10.15. Soakaway test completed at 12:00 5. Trail pit backfilled with arisings.				
Scale		Logged By			Figure No.				
NTS		Ross Duncan (HCE Limited)			TP01				

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD	
Date By Checked		May-26 RD IH	Job no. 1841	Section C&S	Sheet no. IT/ 1	Rev C01	Canolfan Gorseion Centre Millers Drive Gorseinon SA4 4QN
Rev	Date	Details					Tel: 01792 805010
Part							
Infiltration Test Results							
REF							OUTPUT
Infiltration Test Results							

SOIL INFILTRATION TEST

in accordance with BRE Digest 365 (1991 with amendments in 2003 and 2007)

Job Location: Marcholws, Peniel Carmarthenshire SA32 7AA,		Job No. 1841	
Test Pit Number:		Sheet No. IT/02	
Client:	Mr Alistair & Mrs Anwen	TP/01	Date: 14/04/2026
Engineer:	RD	Time To Fill Pit (seconds)	240
		Start Time:	09:55:00

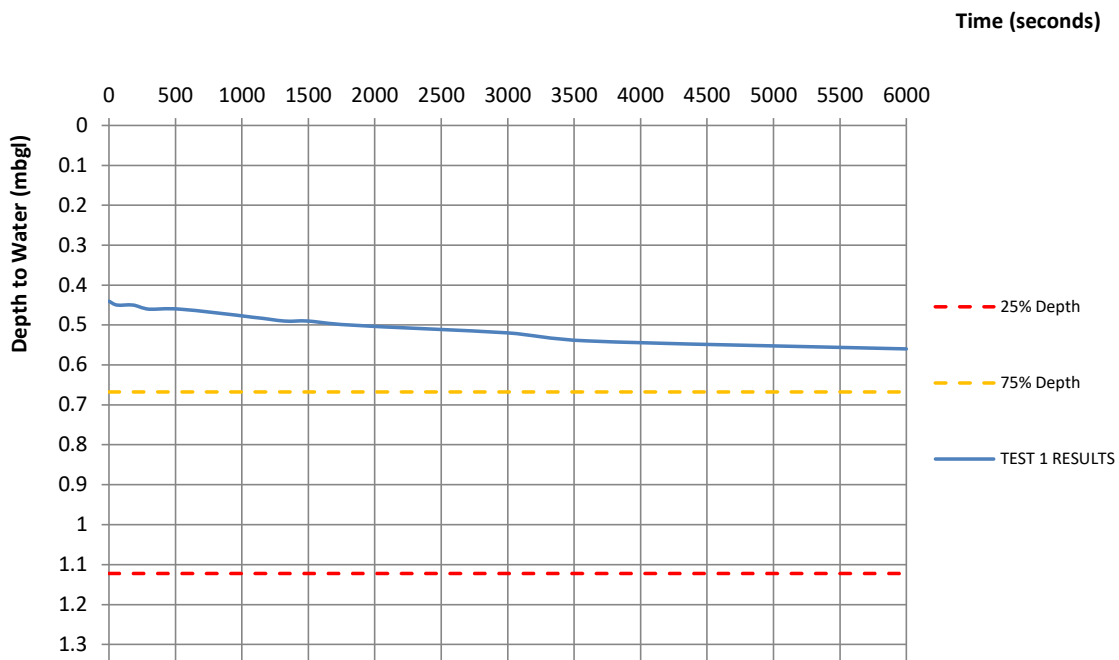
TP/01 Pit Dimensions (m)	
Length	2.70
Width	0.45
Depth	1.35
Height of Pipe above GL (if applicable)	NA

Water Depth (m)		
Test 1	Test 2	Test 3
0.910	NA	NA

Start % For Calculations	75%
End % For Calculations	25%

TP/01 Soil Infiltration Rate (f)	
N/A	m/s
NOTE: Test completed between 75% to 25% full in accordance with BRE Digest 365	

TEST 1 (T1) Infiltration Test Results (f = N/A m/s)



NOTES

- 1 Water bowser used to rapidly fill trail pit as per BRE 365 Requirements
- 2 Water level did not decrease at a constant rate.
- 3 Infiltration rate noticed to NOT be consistent as depth increased.
- 4 Sides of trail pit remained stable & trail pit was back filled upon completion
- 5 Ground was observed to be permeable. Test conducted in rainy weather.

SOIL INFILTRATION TEST

in accordance with BRE Digest 365 (1991 with amendments in 2003 and 2007)

Job Location: Marcholws, Peniel Carmarthenshire SA32 7AA,		Job No. 1841	
Test Pit Number:		Sheet No. IT/02	
Client:	Mr Alistair & Mrs Anwen	TP/02	Date: 14/04/2026
Engineer:	RD	Time To Fill Pit (seconds)	120
		Start Time:	10:15:00

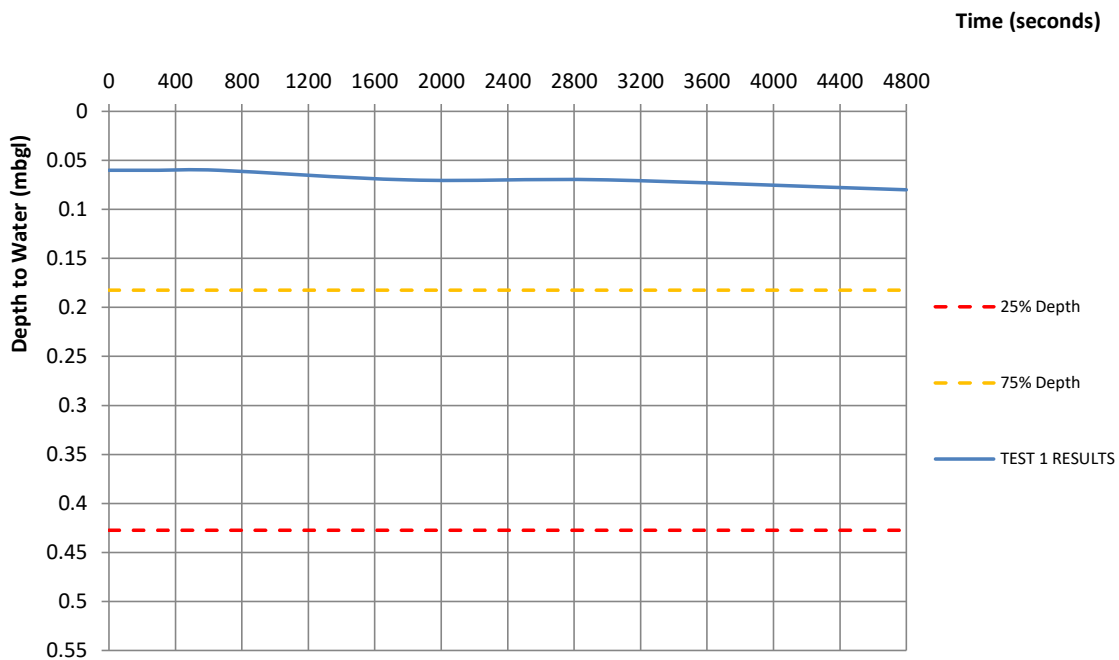
TP/02 Pit Dimensions (m)	
Length	2.40
Width	0.45
Depth	0.55
Height of Pipe above GL (if applicable)	NA

Water Depth (m)		
Test 1	Test 2	Test 3
0.490	NA	NA

Start % For Calculations	75%
End % For Calculations	25%

TP/02 Soil Infiltration Rate (f)	
N/A	m/s
NOTE: Test completed between 75% to 25% full in accordance with BRE Digest 365	

TEST 1 (T1) Infiltration Test Results (f = N/A m/s)



NOTES

- 1 Water bowser used to rapidly fill trail pit as per BRE 365 Requirements
- 2 Water level did not decrease at a constant rate.
- 3 Infiltration rate noticed to NOT be consistent as depth increased.
- 4 Sides of trail pit remained stable & trail pit was back filled upon completion
- 5 Ground was observed to be permeable. Test conducted in rainy weather.

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD
Date By Checked		May-26 RD IH	Job no. 1841	Section C&S	Sheet no. GA / 1	Rev C01
						Canolfan Gorseion Centre Millers Drive Gorseinon SA4 4QN
Rev	Date	Details				Tel: 01792 805010
Part Groundwater Protection Aseessment						
REF						OUTPUT
Groundwater Assessment to CIRIA Simple Index Method						

SIMPLE INDEX APPROACH:
SUMMARY TABLE



HRW shall not be liable for any direct or indirect damage claim, loss, cost, expense or liability howsoever arising out of the use or impossibility to use the tools, even when HRW has been informed of the possibility of the same. The user hereby indemnifies HRW from and against any damage claim, loss, expense or liability resulting from any action taken against HRW that is related in any way to the use of the tool or any reliance made in respect of the output of such use by any person whatsoever. HRW does not guarantee that the tool's functions meet the requirements of any person, nor that the tool is free from errors.

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Residential roofing				
Pollution Hazard Level	Very low				
Pollution Hazard Indices					
TSS	0.2				
Metals	0.2				
Hydrocarbons	0.05				
SuDS components proposed		SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B			
Component 1	Bioretention system (where the system is not designed as an infiltration component)				
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS	0.8				
Metals	0.8				
Hydrocarbons	0.8				
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices		Note: In order to meet both Water Quality criteria set out in the SuDS Manual (Chapter 4), Interception should be delivered for all impermeable areas wherever possible. Interception delivery and treatment may be met by the same components, but Interception requires separate evaluation.	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England		
TSS	0.8				
Metals	0.8				
Hydrocarbons	0.8				
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				

Project: New Agricultural Development At Marcholws, Peniel Carmarthenshire SA32 7AA,				Document Number HCE-1841-CVD-CAL-001		HCE LTD	
Date By Checked		May-26 RD IH	Job no. 1841	Section C&S	Sheet no. FM / 1	Rev C01	Canolfan Gorseion Centre Millers Drive Gorseinon SA4 4QN
Rev	Date	Details				Tel: 01792 805010	
Part NRW Maps							
REF						OUTPUT	
NRW Surface Water Flood Risk Map & TAN-15 Development Advice Map							

Flood Risk from Rivers

High

Medium

Low

Flood Risk from the Sea

High

Medium

Low

Flood Risk from Surface Water & Small Watercourses

High

Medium

Low

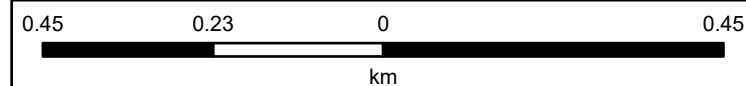
 Risk Level Under Review



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Scale at A3: 1:10,000

Date: 11/05/2026



British National Grid

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Flood Map for Planning - Detail
Flood Map for Planning

Legend

TAN15 Defended Zones

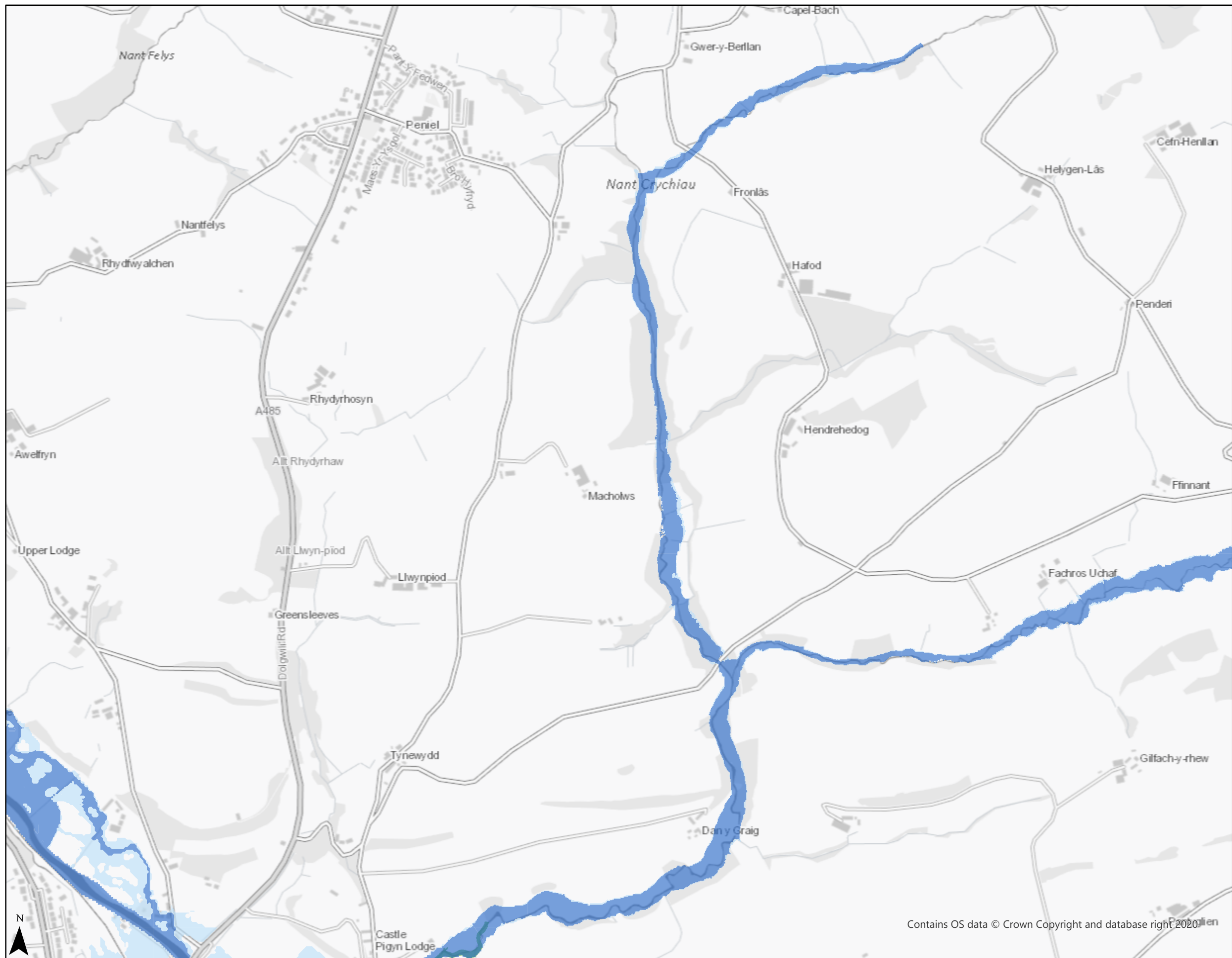
-  Rivers
-  Sea
-  Rivers and Sea

Rivers

-  Flood Zone 3
-  Flood Zone 2

Sea

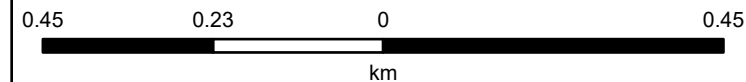
-  Flood Zone 3
-  Flood Zone 2



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Date: 11/05/2026



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