

## HOF and Flow Split Percentage Calculations

Coefficient	1.704
HOF Width (mm)	150
HOF Height (mm)	33
HOF (ls)	1.5
Abstraction %	70
Residual %	30
Peak Abstraction	10.5
TGV Reference	Brendan Coles
Site Name	Wembley Road

Site Name: Wembley Road

TGV Reference: Brendan Coles

Blue boxes (below) show calculated flow rates at peak abstraction  
Orange box indicates the proposed width and flows of the Residual Flow section of the weir design

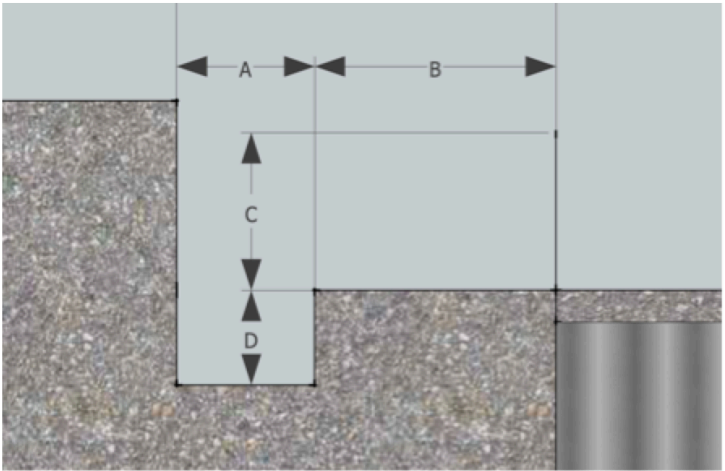
Green Boxes (below) highlight the calculated actual residual flow split left in the watercourse immediately below the intake. In this instance there is always more left in the watercourse than the licenced agreed percentage (over HOF) reducing impact on the depleted reach below that of the nationally adopted Wales Hydropower Guidelines.

Natural Flow (based on WHS Lowflows)		
Table for reference only, does not correspond directly with adjacent table		
Q number	m/s	l/s
5%	0.035	35
10%	0.025	25
20%	0.015	15
30%	0.011	11
40%	0.008	8
50%	0.006	6
60%	0.005	5
70%	0.004	4
80%	0.003	3
90%	0.002	2
95%	0.0015	1.5
99%	0.001	1

			Width of Residual Notch if basic (in addition to HOF notch)		HOF Height (mm) (D)	In the watercourse than the licenced agreed percentage (over HOF) reducing impact on the depleted reach below that of the nationally adopted Wales Hydropower Guidelines.					
			236		33						
Width of Screen (mm)			Proposed Width of Residual Flow notch (mm) (in addition to HOF notch) (B)		HOF Width (mm) (A)						
900		900	117		150	Residual Flow Calculations			Natural Flow Calculations		
Water Level above Weir Crest Height (mm) (C)	Flow over Broad-crested Screen Section (ls)	Quantity abstracted from screen section (ls)	Flow in Residual section		Flow in Hof Section (includes section above & below weir height) mm (ls)	Correct Figure in accordance with licence (HOF + residual split%) (ls)	Proposed Figure based on design (ls)	% of Proposed residual (vs abstracted)	Total Natural Flow (without hydro scheme) (ls)	Remaining Natural Flow (after hydro abstraction) (ls)	Remaining Natural Flow (after hydro abstraction) (%)
			If HOF not causing hydrological interference (ls, pure %)	Proposed quantity in residual flow section (ls) (B)	A		A + B				
0	0.00	0.00	0.00	0.00	1.53	1.5	1.53	100.00%	1.5	1.5	100.0%
10	1.53	1.53	0.66	0.20	2.28	2.16	2.48	38.95%	4.01	2.48	61.8%
20	4.34	4.34	1.86	0.56	3.12	3.36	3.68	33.47%	8.02	3.68	45.9%
30	7.97	7.97	3.42	1.04	4.04	4.92	5.08	30.99%	13.05	5.08	38.9%
36.05	10.50	10.50	4.50	1.36	4.64	6.00	6.00	30.02%	16.50	6.00	36.4%
40	12.27	10.50	5.26	1.59	5.04	6.76	6.64	32.85%	18.91	8.41	44.5%
50	17.15	10.50	7.35	2.23	6.11	8.85	8.34	39.45%	25.49	14.99	58.8%
60	22.54	10.50	9.66	2.93	7.25	11.16	10.18	45.25%	32.72	22.22	67.9%
70	28.40	10.50	12.17	3.69	8.45	13.67	12.14	50.33%	40.54	30.04	74.1%
80	34.70	10.50	14.87	4.51	9.71	16.37	14.22	54.78%	48.92	38.42	78.5%
90	41.41	10.50	17.75	5.38	11.03	19.25	16.41	58.68%	57.82	47.32	81.8%
100	48.50	10.50	20.78	6.30	12.40	22.28	18.70	62.10%	67.20	56.70	84.4%

Calculations use Broad-crested weir equation:  $H = (Q/c*b)^{2/3}$

# Calculations for the Residual Flow Section Width (factoring in the impact of the HOF Notch)



Calculations use Broad-crested weir equation:  $H = (Q/c*b)^{2/3}$

Calculations show how the increase in height of water over the weir crest (-C-) increase disproportionately the quantity of water travelling through section A. Consequently the width of the residual flow channel (B) is reduced so that when the scheme is abstracting at Qmean the amount left in the watercourse is HOF + the correct percentage of residual flow. Calculations show how 2 different broad-crested notch equations are calculated for each section (A+B). Between A and B there will be a vertical stainless steel plate separating the two different flows.

$=(5E8*(\$L\$17/1000)*((\$G28+\$L\$15)/1000)^(3/2))*1000$		
<b>HOF and Flow Split Percentage Calculations</b>		
Site Name: Llechweddystad TGV Reference: 11-055		
Blue boxes (below) show calculated flow rates at peak abstraction Orange box indicates the proposed width and flows of the Residual Flow section of the weir design		
Green residue below it in the v (over H that		
Coefficient 1.704		
HOF Width (mm) 112		
HOF Height (mm) 75		
HOF (ls) 4		
Abstraction % 70		
Residual % 30		
Peak Abstraction 38.4		
TGV Reference 11-055		
Site Name Llechweddystad		
Width of Residual Notch if basic (in addition to HOF notch) 402		
HOF Height (mm) (D) 75		
Proposed Width of Residual Flow notch (mm) (in addition to HOF notch) (B) 308		
HOF Width (mm) (A) 112		
Residual Flow Cal		
Water Level above Weir Crest Height (mm) (C)		
Flow over Broad-crested Screen Section (ls)		
Quantity abstracted from screen section (ls)		
Flow In Residual section		
Flow in Hof Section (includes section above & below weir height) mm (ls)		
Correct Figure in accordance with licence (HOF + residual split%) (ls)		
Propo Figure t on desig		
If HOF not causing hydrological interference (ls, pure %)		
Proposed quantity in residual flow section (ls) (B)		
A		
0 0.00 0.00 0.00 0.00 3.92 4 3.9		
10 2.04 2.04 0.88 0.52 4.73 4.88 5.2		
20 5.78 5.78 2.48 1.48 5.59 6.48 7.0		
30 10.63 10.63 4.55 2.73 6.49 8.55 9.2		
40 16.36 16.36 7.01 4.20 7.44 11.01 11.6		
50 22.86 22.86 9.80 5.87 8.43 13.80 14.3		
60 30.05 30.05 12.88 7.71 9.47 16.88 17.1		
70 37.87 37.87 16.23 9.72 10.54 20.23 20.2		
70.65 38.40 38.40 19.83 11.88 11.65 23.83 23.5		
80 46.27 38.40 19.83 11.88 11.65 23.83 23.5		
90 55.21 38.40 23.66 14.17 12.79 12.79 12.79		
100 64.66 38.40 27.71 16.60 13.97 13.97 13.97		

$=(5E8*(\$J\$17/1000)*((\$G28/1000)^(3/2))*1000$		

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