HOF and Flow Split Percentage Calculations

Coefficient	1.704
HOF Width (mm)	75
HOF Height (mm)	52
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

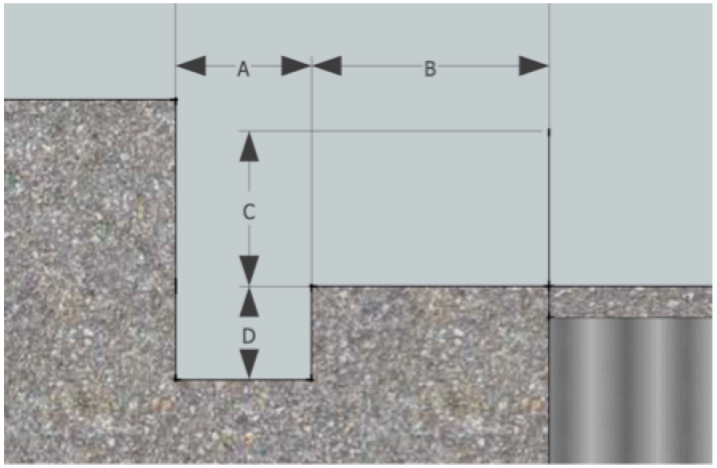
Green Boxes (below) highlight the calculated actual residual flow split left in the watercourse immediately below the intake. In this instance there is always more left in the watercourse than the licenced agreed percentage (over HOF) reducing impact on the depleted reach below that of the nationally 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)						
			311		52						
	Width of Screen (mm)		Proposed Width of Residual Flow notch (mm) (in addition to HOF notch) (B)		HOF Width (mm) (A)						
	900	900	228		75						
						Residual Flow Calculations			Natural Flow Calculations		
Water Level above Weir Crest Height (mm) (C)	Flow over Broad-crest 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 interferance (ls, pure %)	Proposed quantity in residual flow section (ls) (B)	A		A + B				
0	0.00	0.00	0.00	0.00	1.52	1.5	1.52	100.00%	1.5	1.5	100.0%
10	1.53	1.53	0.66	0.39	1.97	2.16	2.36	35.97%	3.90	2.36	60.6%
20	4.34	4.34	1.86	1.10	2.47	3.36	3.57	32.28%	7.91	3.57	45.1%
30	7.97	7.97	3.42	2.02	3.00	4.92	5.02	30.64%	12.99	5.02	38.6%
36.05	**10.50**	**10.50**	**4.50**	**2.66**	**3.34**	**6.00**	**6.00**	**30.00%**	**16.50**	**6.00**	**36.4%**
40	12.27	10.50	5.26	3.11	3.57	6.76	6.67	33.01%	18.94	8.44	44.6%
50	17.15	10.50	7.35	4.34	4.16	8.85	8.51	40.02%	25.65	15.15	59.1%
60	22.54	10.50	9.66	5.71	4.79	11.16	10.50	46.15%	33.04	22.54	68.2%
70	28.40	10.50	12.17	7.20	5.45	13.67	12.64	51.48%	41.04	30.54	74.4%
80	34.70	10.50	14.87	8.79	6.13	16.37	14.92	56.10%	49.62	39.12	78.8%
90	41.41	10.50	17.75	10.49	6.84	19.25	17.33	60.12%	58.74	48.24	82.1%
100	48.50	10.50	20.78	12.29	7.57	22.28	19.86	63.62%	68.36	57.86	84.6%

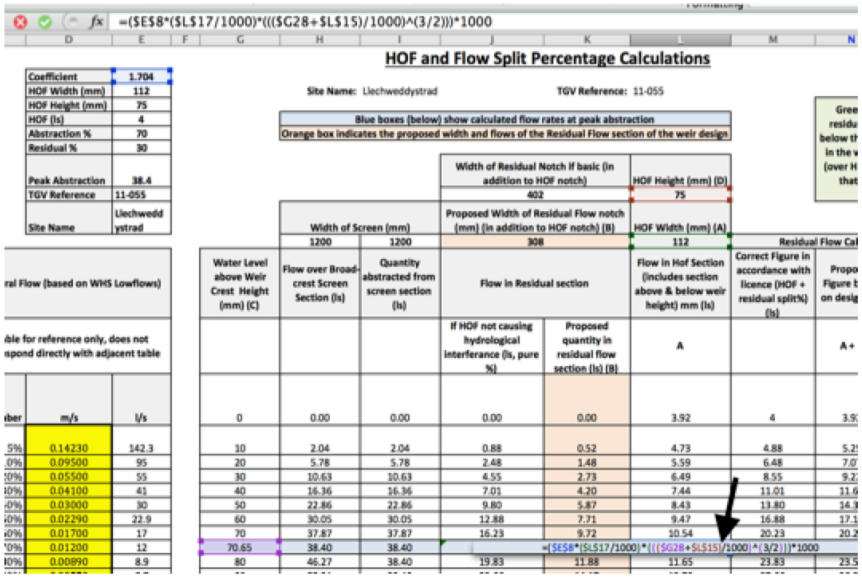
Calculations use Broad-crested weir equation:	H = (Q/c*b)) ^2/3

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 quatity 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 seperating the two different flows.


=($E$8*($L$17/1000)*((($G28+$L$15)/1000)^(3/2)))*1000

HOF and Flow Split Percentage Calculations

Site Name: Llechweddystrad TGV Reference: 11-055

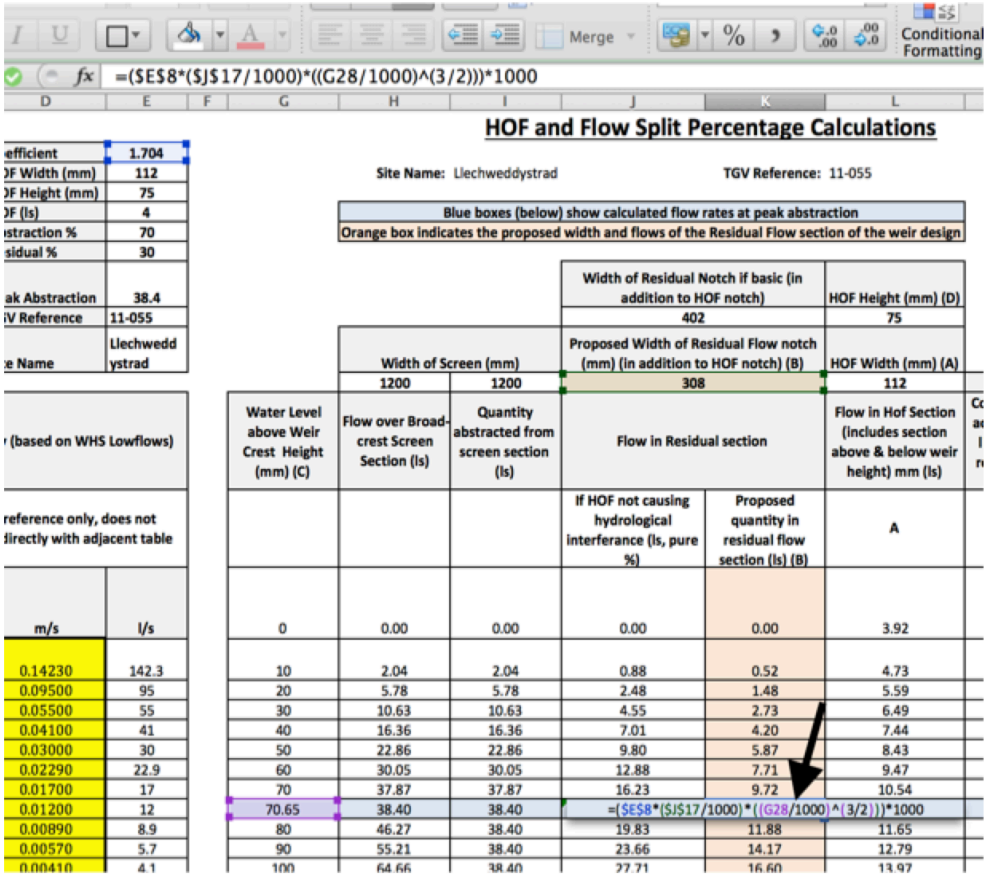
Blue boxes (below) show calculated flow rates at peak abstraction
Orange box indicates the proposed width and flows of the Residual Flow section of the weir design

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	Llechweddystrad

Width of Residual Notch if basic (in addition to HOF notch)	402	HOF Height (mm) (D)	75
Width of Screen (mm)	1200 / 1200	Proposed Width of Residual Flow notch (mm) (in addition to HOF notch) (B)	308	HOF Width (mm) (A)	112

Water Level above Weir Crest Height (mm) (C)	Flow over Broad-crest Screen Section (ls)	Quantity abstracted from screen section (ls)	Flow in Residual section: If HOF not causing hydrological interferance (ls, pure %)	Flow in Residual section: Proposed quantity in residual flow section (ls) (B)	Flow in Hof Section (includes section above & below weir height) mm (ls)	Correct Figure in accordance with licence (HOF + residual split%) (ls)
					A	
0	0.00	0.00	0.00	0.00	3.92	4
10	2.04	2.04	0.88	0.52	4.73	4.88
20	5.78	5.78	2.48	1.48	5.59	6.48
30	10.63	10.63	4.55	2.73	6.49	8.55
40	16.36	16.36	7.01	4.20	7.44	11.01
50	22.86	22.86	9.80	5.87	8.43	13.80
60	30.05	30.05	12.88	7.71	9.47	16.88
70	37.87	37.87	16.23	9.72	10.54	20.23
70.65	38.40	38.40	=($E$8*($L$17/1000)*((($G28+$L$15)/1000)^(3/2)))*1000			
80	46.27	38.40	19.83	11.88	11.65	23.83

(based on WHS Lowflows)	
reference only, does not directly with adjacent table	
m/s	l/s
0.14230	142.3
0.09500	95
0.05500	55
0.04100	41
0.03000	30
0.02290	22.9
0.01700	17
0.01200	12
0.00890	8.9
0.00570	5.7
0.00410	4.1


=($E$8*($J$17/1000)*((G28/1000)^(3/2)))*1000

HOF and Flow Split Percentage Calculations

Site Name: Llechweddystrad TGV Reference: 11-055

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					A
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20	5.78	5.78	2.48	1.48	5.59
30	10.63	10.63	4.55	2.73	6.49
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50	22.86	22.86	9.80	5.87	8.43
60	30.05	30.05	12.88	7.71	9.47
70	37.87	37.87	16.23	9.72	10.54
70.65	38.40	38.40	=($E$8*($J$17/1000)*((G28/1000)^(3/2)))*1000		
80	46.27	38.40	19.83	11.88	11.65
90	55.21	38.40	23.66	14.17	12.79
100	64.66	38.40	27.71	16.60	13.97