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Company Registration Number 7417466
MCS Hydro Transition Installer 123

Geomorphology Photo Survey: Version 1 (Date: 15th March 2023)
Applicant's Name: IW & OM Jones (farm business partnership)
Site Name: Ty Mawr
Site Address: Tŷ Mawr, Mallwyd, Machynlleth, SY20 9HS
Watercourse Name: Nant Llyn

Basic site information:

1. The hydropower scheme proposed is 34.0kW and will produce an estimated 124,000 kWh (units) of electricity per year sufficient for 43 average UK homes and a 26 tonne reduction of carbon dioxide emissions annually. *(Average UK home uses 2,900 kWh/yr according to Ofgem's 'Typical Domestic Consumption Values' for 2020. Government figures for 2021 for emissions from electricity production: 0.21233kg CO2e per kWh)*

2. Intake Grid Reference: SH 90071 11071
3. Intake weir crest elevation: 211.100mAOD
4. Power house (turbine) Grid Reference: SH 89393 11369
5. Power house (turbine) finished floor elevation: 160.831mAOD
6. Outfall Grid Reference: SH 89383 11367
7. Outfall invert (base) elevation: 159.212mAOD
8. Catchment Area and Watercourse Flow
    a. Catchment Area: 3.464 square kilometres
    b. Annual Rainfall: 1820mm
    c. Annual Runoff: 1509mm
    d. Average Daily Flow (ADF) or Mean Flow: 166 litres per second
    e. Length of depleted reach: 870 metres
    f. Gross Head: Intake weir crest to outfall invert 51.9 metres
    g. Average depleted reach gradient 6%
9. Flow Rates & Abstraction Regime
    a. Turbine's Gross Head: 49.1 metres
    b. Turbine's Net Head (@ design flow): 46.3 metres
    c. Design Flow (Max Turbine Flow): 97.3 litres per second
    d. Minimum Turbine Flow: 5 litres per second
    e. Hands Off Flow (Q95): 13.0 litres per second
    f. Abstraction Regime Above Q95: 50%

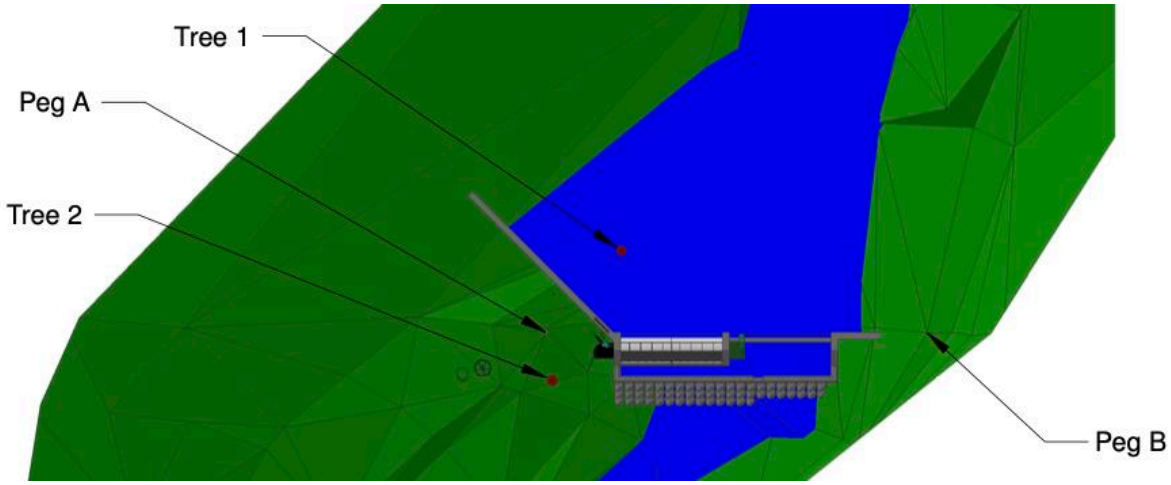
Effect of abstraction on Flow Regime:

% Exceedance Probability	Flow upstream of abstraction [l/s]	Abstraction [l/s]	Abstraction as percentage of upstream flow	Residual flow downstream of weir [l/s]	Residual flow as percentage of upstream flow
5%	602	97.3	16.2%	505	83.8%
10%	407	97.3	23.9%	310	76.1%
15%	322	97.3	30.3%	224	69.7%
20%	236	97.3	41.2%	139	58.8%
25%	197	91.8	46.7%	105	53.3%
30%	157	72.0	45.9%	85	54.1%
35%	134	60.3	45.1%	73	54.9%
40%	110	48.5	44.1%	62	55.9%
45%	96	41.3	43.2%	54	56.8%
50%	81	34.0	42.0%	47	58.0%
55%	71	28.8	40.8%	42	59.2%
60%	60	23.5	39.2%	37	60.8%
65%	52	19.5	37.5%	33	62.5%
70%	44	15.5	35.2%	29	64.8%
75%	37	12.0	32.4%	25	67.6%
80%	30	8.5	28.3%	22	71.7%
85%	25	5.8	23.5%	19	76.5%
90%	19	0.0	0.0%	19	100.0%
95%	13	0.0	0.0%	13	100.0%
100%	7	0.0	0.0%	7	100.0%

Intake site: (Location 6) NGR : SH 90071 11071

The proposal is to build a concrete intake weir with a coanda screen. The red line on the photos shows the approximate location of the weir's crest.

Plan view of the proposal:

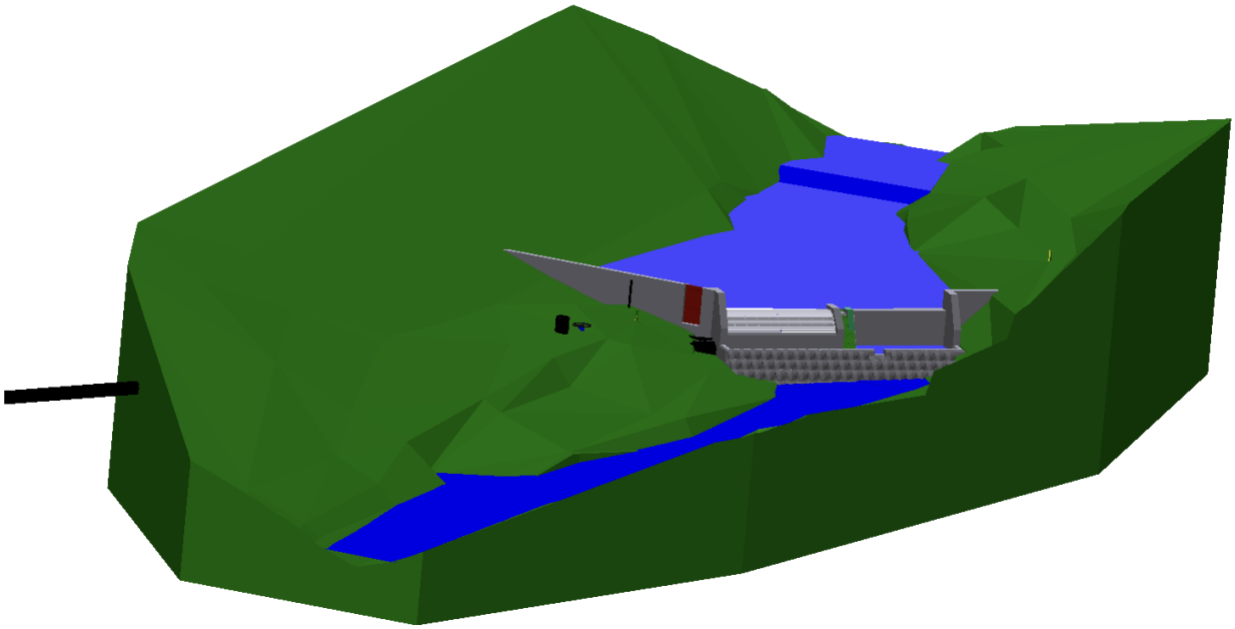


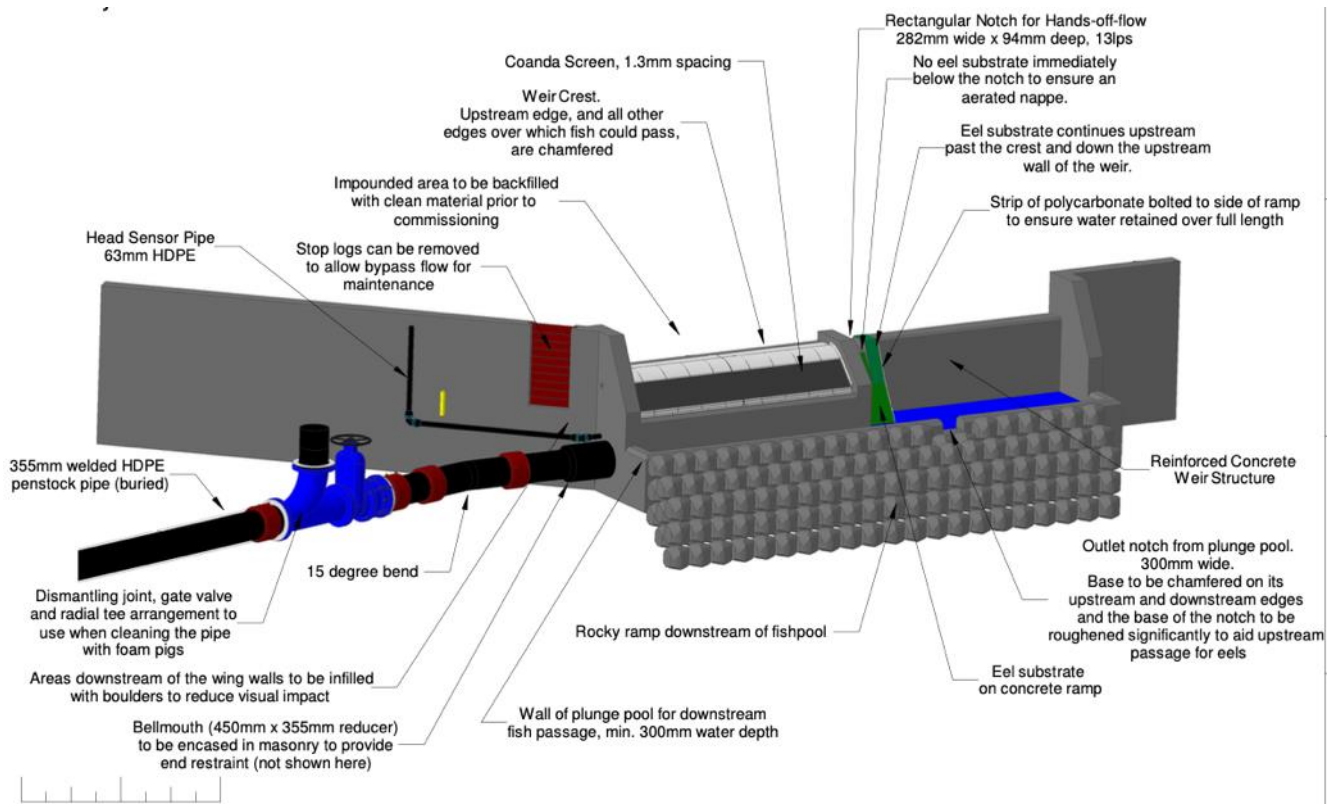

Tree 2
Tree 1
Peg B


Tree 2
Tree 1
Peg A

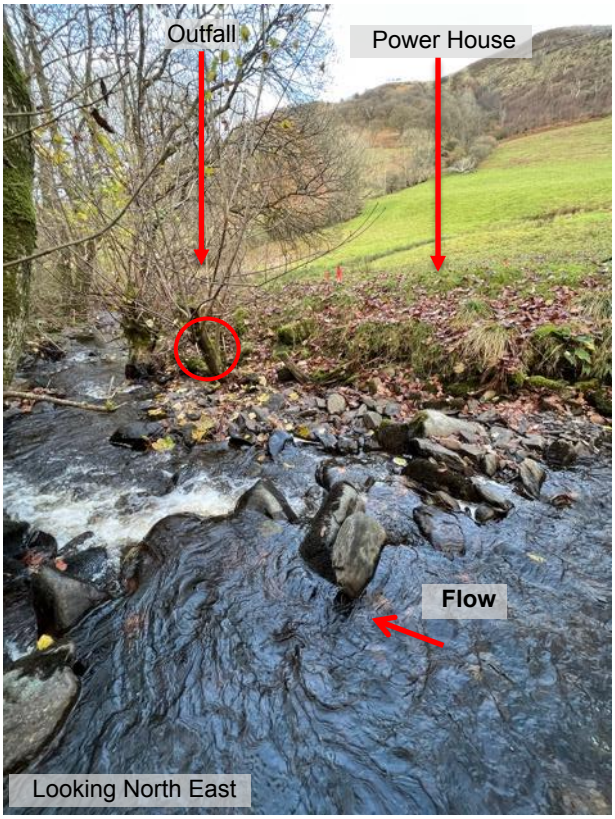

View looking downstream with the photographer standing approximately on the line of the weir
Tree 2
Peg A

3D model of the proposal:

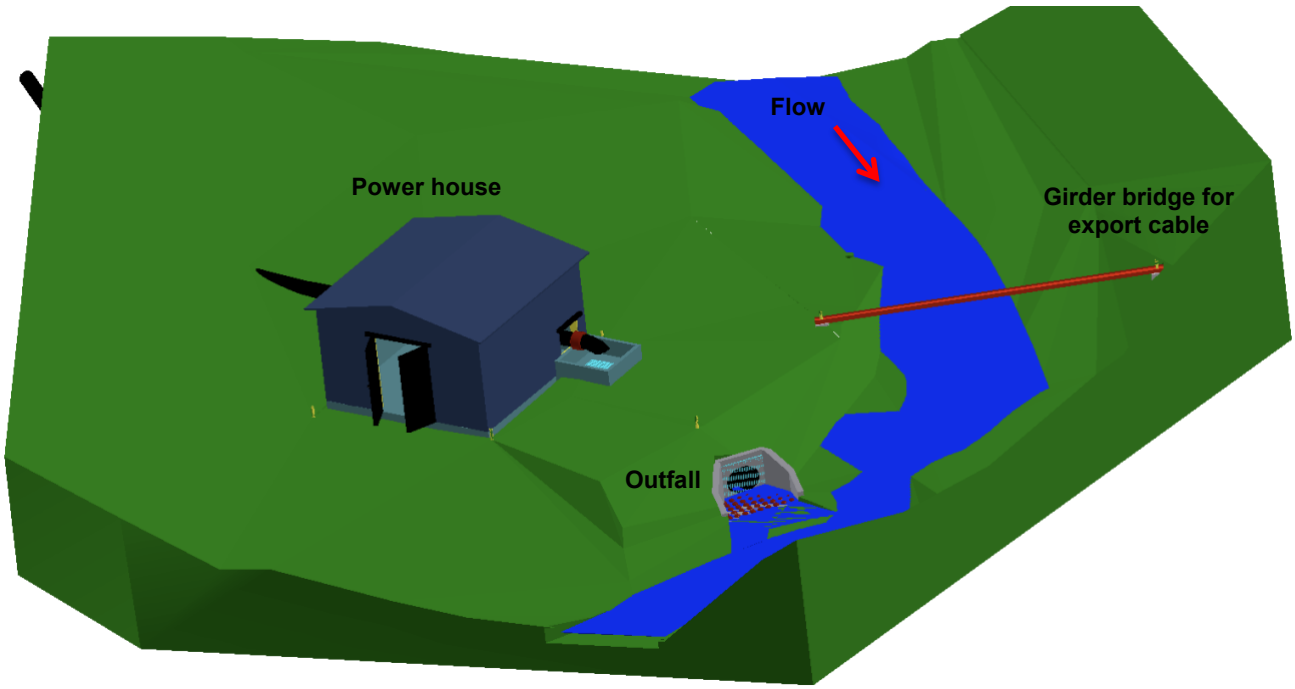




Outfall site: (Location 17) NGR : SH 89383 11367



3D model of the proposal:



List of photo locations

All photo location numbers refer to the numbers highlighted yellow on the attached site plan. Where heights of falls are stated, these have been measured using a Leica Disto D510 laser measure.

Location 1 NGR:	SH9052711244	
Location 2 NGR:	SH9044811241	
Location 3 NGR:	SH9028711192	
Location 4 NGR:	SH9019811136	2.5m vertical fall over 25m horizontal distance
Location 5 NGR:	SH9011111090	1m falls, 0.3m deep pool at base
Location 6 NGR:	SH9007111071	Intake
Location 7 NGR:	SH9001211069	1m falls
Location 8 NGR:	SH8995111061	0.8m falls, 0.5m deep pool at base
Location 9 NGR:	SH8986011060	1m vertical fall over 7m horizontal distance
Location 10 NGR:	SH8977011060	17m long pool, 0.3m deep
Location 11 NGR:	SH8969311072	
Location 12 NGR:	SH8961511133	1.3m falls with over-hang
Location 13 NGR:	SH8956311175	0.6m falls, 0.4m deep pool at base
Location 14 NGR:	SH8951911245	
Location 15 NGR:	SH8945011286	
Location 16 NGR:	SH8940911337	
Location 17 NGR:	SH8938311367	Outfall
Location 18 NGR:	SH8939011406	Tributary joins Nant Llyn
Location 19 NGR:	SH8935911427	Culvert under road
Location 20 NGR:	SH8933311464	Nant Llyn joins Afon Tafolog
Location 21 NGR:	SH8932011558	
Location 22 NGR:	SH8935611649	Access bridge to Ty Mawr Farm
Location 23 NGR:	SH8937011728	
Location 24 NGR:	SH8932111796	

Location 1 NGR: SH9052711244

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

Location 2 NGR: SH9044811241

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

Location 3 NGR: SH9028711192

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

Location 4 NGR: SH9019811136 2.5m vertical fall over 25m horizontal distance

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

Looking up tributary

Location 5 NGR: SH9011111090 1m falls, 0.3m deep pool at base

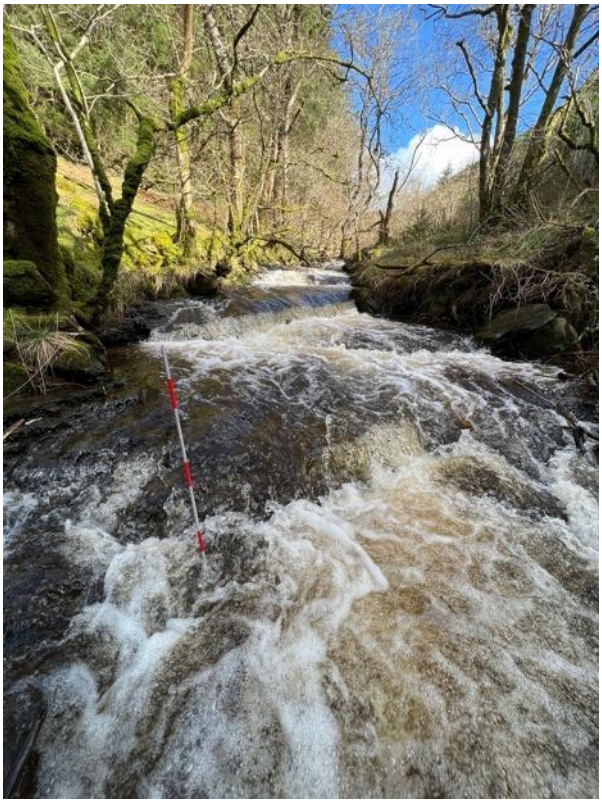
View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

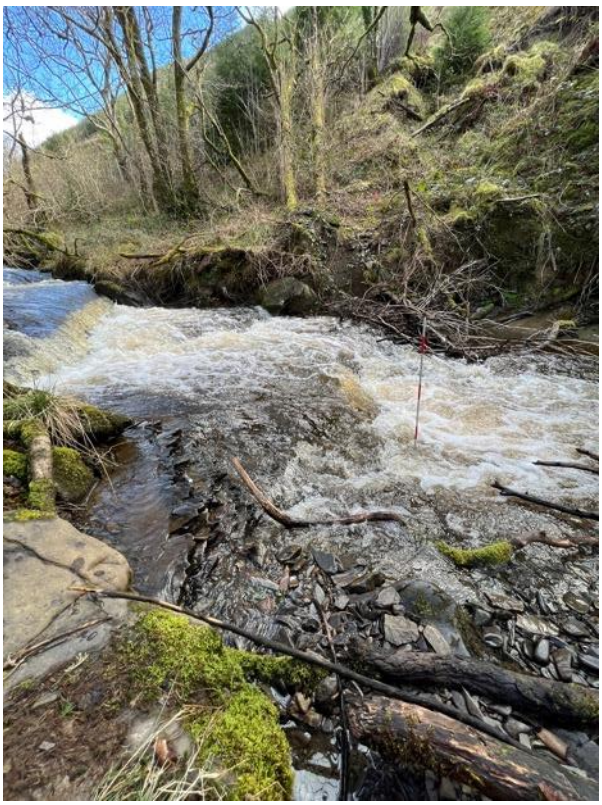
Location 6 NGR: SH9007111071 Intake

View looking downstream (1250mm staff for scale)



View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)



View looking South East (1250mm staff for scale)

Location 7 NGR: SH9001211069 1m falls

View looking downstream (1250mm staff for scale)

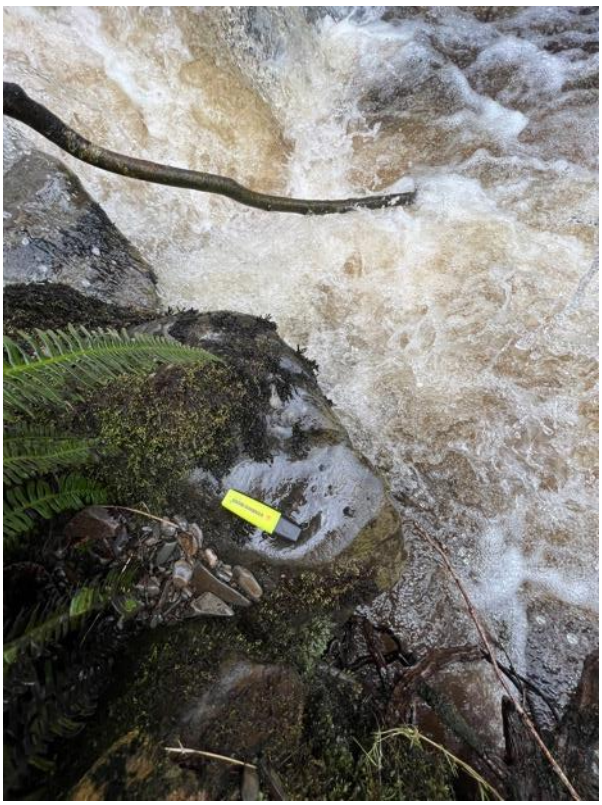
View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

Location 8 NGR: SH8995111061 0.8m falls, 0.5m deep pool at base

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)



Bed Material (100mm pen for scale)

Location 9 NGR: SH8986011060 1m vertical fall over 7m horizontal distance

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

Location 10 NGR: SH8977011060 17m long pool, 0.3m deep

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

Location 11 NGR: SH8969311072

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

Location 12 NGR: SH8961511133 1.3m falls with over-hang

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

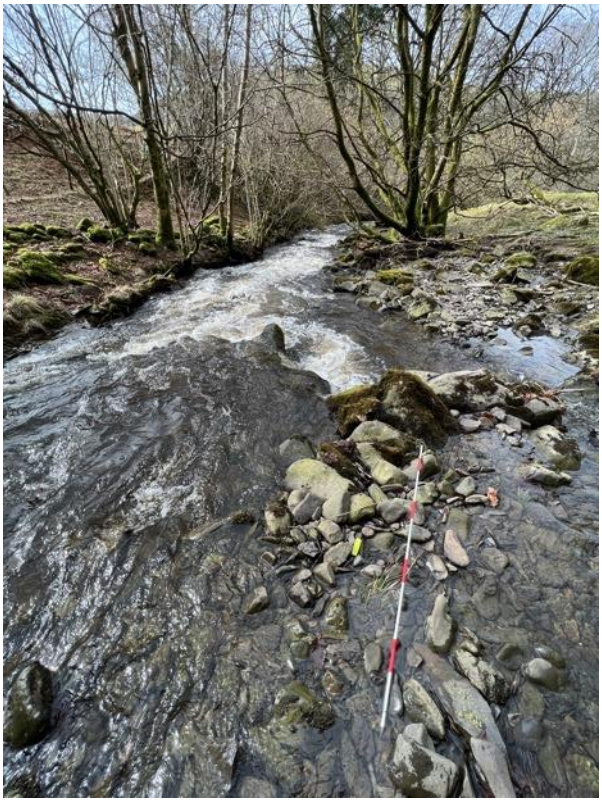
Location 13 NGR: SH8956311175 0.6m falls, 0.4m deep pool at base

View looking downstream (1250mm staff for scale)

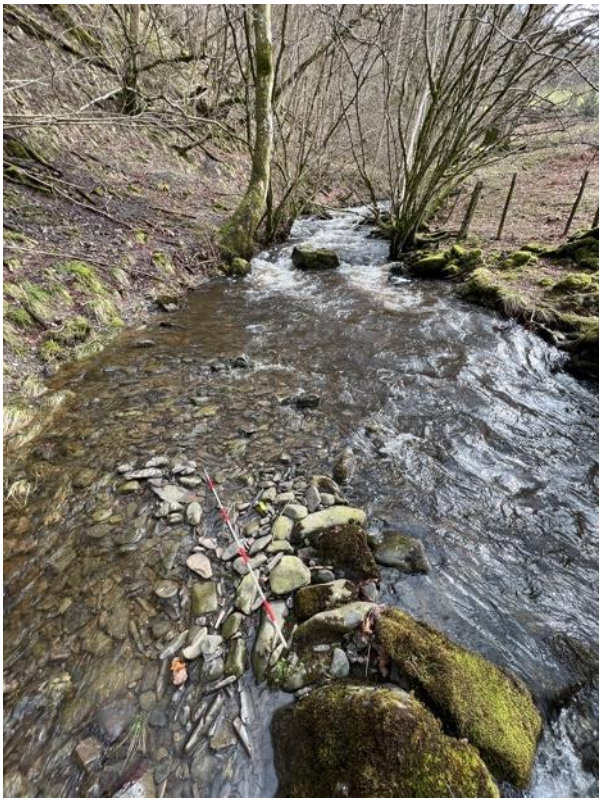
View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

Location 14 NGR: SH8951911245



View looking downstream (1250mm staff for scale)



View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

Location 15 NGR: SH8945011286

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

Location 16 NGR: SH8940911337

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

Location 17 NGR: SH8938311367 Outfall

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

View looking East (1250mm staff for scale)

Location 18 NGR: SH8939011406 Tributary joins Nant Llyn

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)

View looking North East, up the tributary (1250mm staff for scale)

Location 19 NGR: SH8935911427 Culvert under road

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

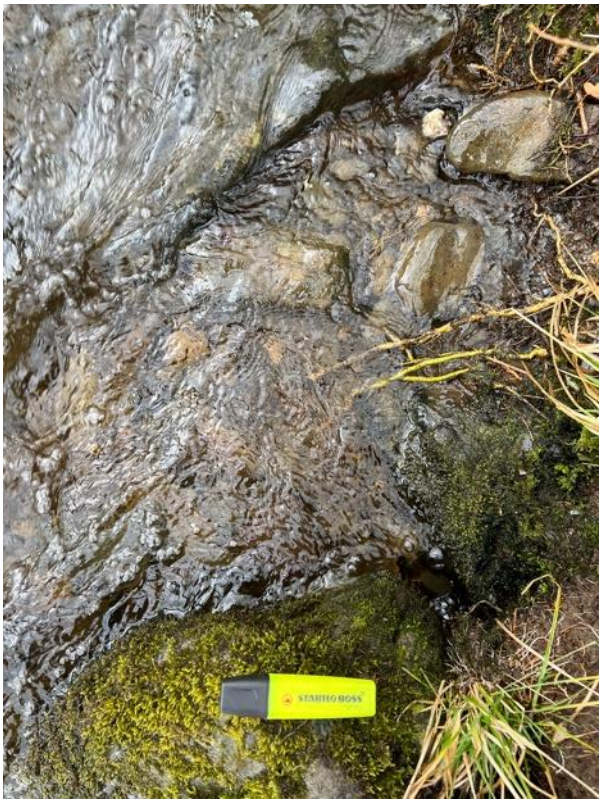
Bed material on the upstream side of the culvert (100mm pen for scale)

View looking downstream from the culvert (1250mm staff for scale)

Location 20 NGR: SH8933311464 Nant Llyn joins Afon Tafolog

View looking down Afon Tafolog with Nant Llyn joining from the right (1250mm staff for scale)

View looking up Nant Llyn (1250mm staff for scale)



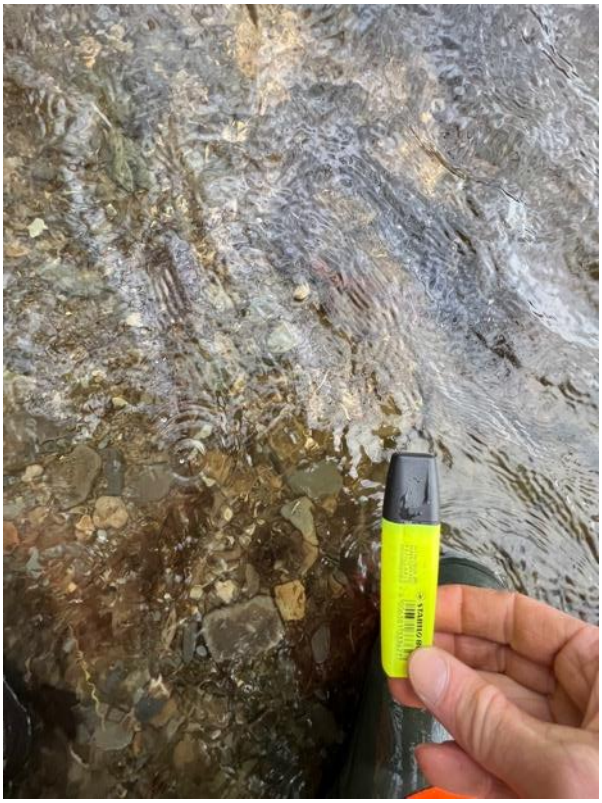
Bed Material (100mm pen for scale)

View looking up Afon Tafolog from the confluence (1250mm staff for scale)

Location 21 NGR: SH8932011558

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)



Bed Material (100mm pen for scale)

Location 22 NGR: SH8935611649 Access bridge to Ty Mawr Farm

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed material upstream of the bridge (100mm pen for scale)

Bed material downstream of the bridge (100mm pen for scale)

Location 23 NGR: SH8937011728

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

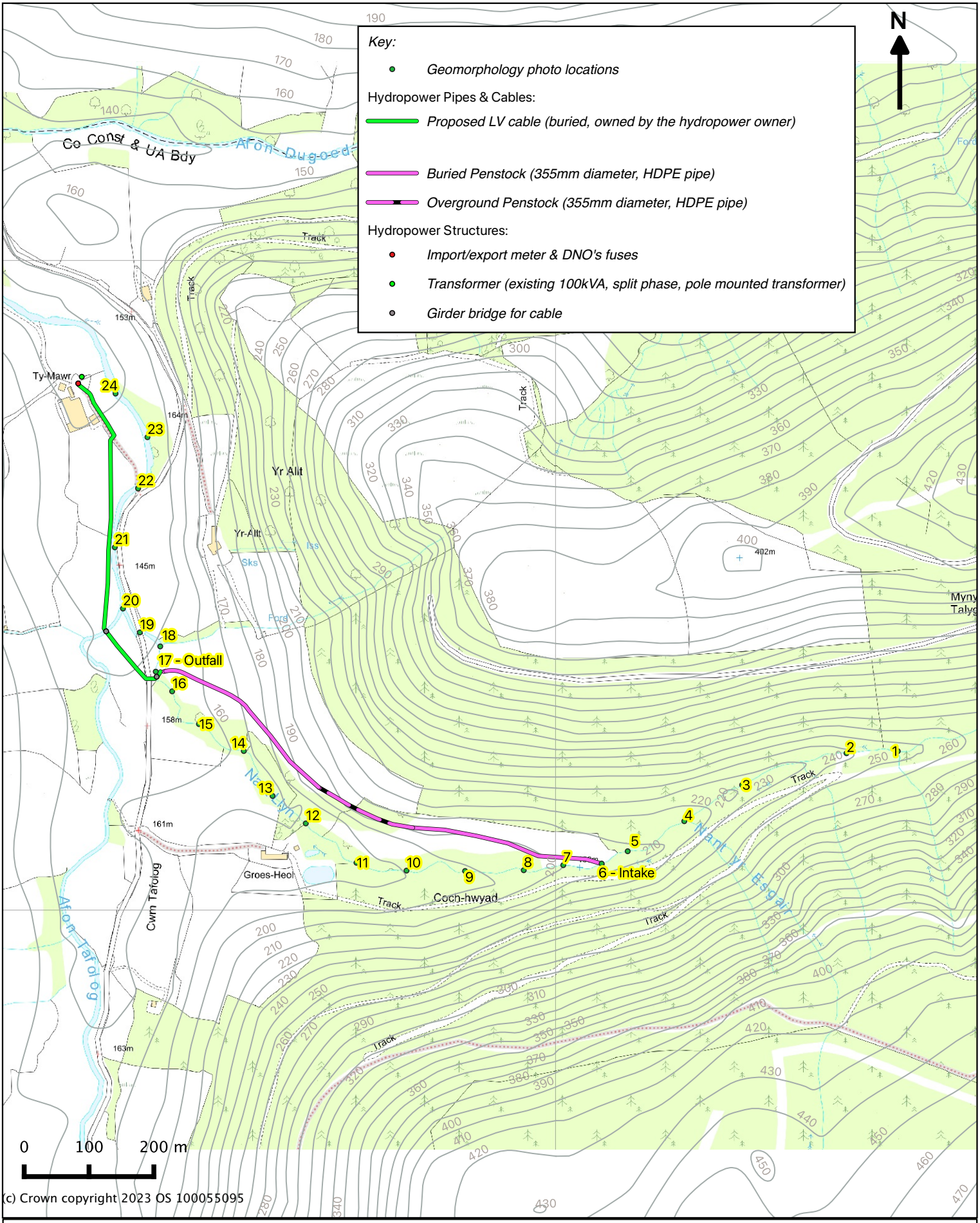
Bed Material (100mm pen for scale)

Location 24 NGR: SH8932111796

View looking downstream (1250mm staff for scale)

View looking upstream (1250mm staff for scale)

Bed Material (100mm pen for scale)



Client: Dylan Jones
Installation Address: Tŷ Mawr, Mallwyd, Machynlleth, SY20 9HS
Drawing Title: Geomorphology photo locations
Drawn By: LMB
Date: 15th March 2023
Scale @ A4: 1:7,500
Dwg No: 230315LB01
Version: 1

Greenearth Hydro

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