



Cyfoeth Naturiol Cymru
Natural Resources Wales

Water Resources LICENCE TO

ABSTRACT

WATER

Environment Act 1995
Water Resources Act 1991 as amended
by the Water Act 2003
Water Resources (Abstraction and
Impounding) Regulations 2006
Natural Resources Body for Wales (Functions)
Order 2012

IMPORTANT NOTES

Need for safekeeping

This licence is an important document. The permission or right to abstract water may be valuable to your landholding. So -

- **Keep the licence safe, preferably with your deeds etc.**
- **Take careful note of the comments below about "transfer and apportionment" and "death and bankruptcy".**

This is to ensure that the permission and any rights granted by the licence continue if you need to pass it on to someone else.

If you want to:

- **revoke (cancel) the licence;**
- **vary (change/amend) the licence in any way or**
- **change your contact address (but you continue to hold the licence).**

Please write to us at your local Natural Resources Wales office.

Details of this licence are placed on a register, kept by Natural Resources Wales and open for inspection by the public. The public may also obtain further details about it by virtue of the Environmental Information Regulations 2004 (see also Disclosure of Information) except in special cases (for advice please contact us at the address shown on the front page of the licence).

Transfer and apportionment

If you need to pass this licence or any part of it to someone else, you must contact Natural Resources Wales and obtain the appropriate application forms. Temporary licences cannot be transferred or apportioned. The licence holder remains responsible for compliance with the terms of the licence and any charges payable until the licence has been transferred or apportioned.

Death or bankruptcy of the licence holder

If a licence has been 'vested' in you, as a result of the death or bankruptcy of the licence holder, please contact Natural Resources Wales in writing, telling us the licence number(s) and the date that the licence vested in you as a personal representative or trustee of the licence holder. This is necessary in order to enable you to subsequently transfer the licence.

'Vesting' is the transfer of responsibility and ownership of a licence when an existing licence holder is no longer able to hold the licence either through death or bankruptcy.

You do not have to complete a form, but you must notify us in writing within 15 months of the date of vesting, giving the full names of all personal representatives or trustees and a contact address.

Time limits

Your licence may be subject to a time limit (stated on the front of your licence). All new abstraction licences are legally required to include a time limit. For variations to licences, time limits are added in accordance with our policy.

The duration of a time limit is determined in accordance with our time limiting policy. The time limit is linked to the next or subsequent review of water resources within a Catchment Abstraction Management Strategy (CAMS).

There will be a presumption of renewal providing three tests are met: environmental sustainability is not in question; there is continued justification of need; and water is being used efficiently. Any application for renewal will still be subject to the normal statutory considerations.

If your licence is time limited and you wish to renew it when it expires, you will need to apply for a new licence to replace the existing one. You are advised to submit this application at least three months before it expires. To allow you to give early consideration to this, we will send you a reminder approximately 18 months before the expiry date.

If your licence cannot be renewed, we will endeavour to give at least six years notice. We will also endeavour to give at least six years notice where the licence is likely to be renewed on different terms and will significantly impact upon the use of the licence.

In exceptional circumstances, for example where there are other overriding statutory duties such as the Habitats Regulations, it may not be possible to provide six years notice.

Charges

Unless specifically exempted, we may levy an annual CHARGE for water AUTHORISED to be abstracted by this licence, in accordance with our abstraction charges scheme in force at the time.

The licence may be revoked if charges are not paid.

Quantity and quality of water

You must not abstract more than the quantity specified in the licence.

Natural Resources Wales does not, by issue of this licence or otherwise, in any way guarantee that the source of supply will produce the quantity of water authorised to be abstracted by this licence, nor that the water is fit for its intended use.

The quantity of water authorised for abstraction is given in cubic metres. One cubic metre is approximately 220 gallons.

(The precise conversion is 1 cubic metres = 219.969 gallons).

Source of supply and authorised point of abstraction

You may abstract from the point(s) specified in the licence and from no other points. If you want to add or change the authorised point(s) of abstraction, you must apply to us to vary the licence.

Land on which water is authorised to be used

Where this condition applies, you may only use the water you abstract on the area specified in the licence. You must apply to us to vary the licence if you wish to extend or alter this area or remove it.

Purpose for which water is authorised to be used

You may only use the water for the purpose(s) specified in the licence. You must apply to us to vary the licence if you wish to add to or change the purpose(s).

Offences

Under the Water Resources Act 1991 it is an offence:-

- to abstract water, or cause or permit any other person to abstract water, unless the abstraction is authorised by and in accordance with an abstraction licence, or is subject to an exemption;
- to do anything to enable abstraction, or to increase abstraction, except in accordance with an abstraction licence or exemption;
- to fail to comply with the conditions of an abstraction licence.
Note in particular that it may be a condition of the licence to maintain the meter or other measuring device etc. and failure to do so will be an offence;
- to interfere with a meter or other device which measures quantities of water abstracted so as to prevent it from measuring correctly;
- to fail to provide information which we have reasonably required for the purpose of carrying out any of the Natural Resources Wales water resources functions;
- to knowingly make false statements for the purpose of obtaining a licence or consent or in giving required information.

The requirement for a licence is subject to some exemptions, set out in the Water Resources Act 1991 as amended. If in any doubt as to whether you need a licence, contact us at the address shown at the bottom of the front page of the licence.

Right of appeal

If you are dissatisfied with our decision on your licence application, you may appeal.

If you are in England, you should write to the Secretary of State for the Environment, Food and Rural Affairs, care of The Planning Inspectorate at: Room 4/19 Eagle Wing, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6PN.

If you are in Wales, you should write to Welsh Government care of The Planning Inspectorate at: Crown Buildings, Cathays Park, Cardiff, CF10 3NQ.

You must serve notice of appeal within 28 days of the date of receipt of this licence (although the Secretary of State and The Welsh Government have power to allow a longer period for serving notice of appeal). See Water Resources Act 1991, section 43.

Disclosure of information

Information about this licence is available in the public Register held by Natural Resources Wales. Members of the public are also entitled to ask us for other "environmental information" it holds, including any activities likely to affect "the state of any water" or any "activities or other measures designed to protect it". That would include the information additional to the licence document e.g. any related agreement or abstraction returns. In certain restricted circumstances it is possible to claim that information should be kept confidential. If you require more information about keeping this information off the public register because it is confidential, please contact us by writing to the address shown on the front page of the licence within 28 days of receiving this licence.



**Cyfoeth
Naturiol
Cymru
Natural
Resources
Wales**

Licence serial number	WA/466/0006/002/V002
Please quote the serial number in all correspondence about this licence	

FULL LICENCE TO ABSTRACT WATER

The Natural Resources Body for Wales (hereafter referred to as "NRW") grants this licence to:-

Maes Elwy Hydro Limited ("the Licence Holder")

1 Stanley Street
Chester
Cheshire
CH1 2LR

Company Registration Number: 08538439

This licence authorises the Licence Holder to abstract water from the source of supply described in the Schedule of Conditions to this licence and subject to the provisions of that Schedule. The licence commences from the effective date shown below and shall remain in force until the date of expiry shown below.

Signed:

Ashley Lansdown
Permitting Team Leader
Permitting Service
Natural Resources Wales
Cambria House
29 Newport Road
Cardiff
CF24 0TP

Date of issue.....05 November 2018

Date effective.....05 November 2018

Date of expiry.....31 March 2029

Date of original issue.....26 September 2014

This licence should be kept safe and its existence disclosed on any sale of the property to which it relates. Please read the 'important notes' on the cover to this licence.

Note: References to "the map" are to the map which forms part of this licence.
References to "NRW" are to the Natural Resources Body for Wales or any successor body.

SCHEDULE OF CONDITIONS

1. SOURCE OF SUPPLY

- 1.1 Inland water (river) known as Afon Elwy at Maes Elwy, St. Asaph, Denbighshire.

2. POINT OF ABSTRACTION

- 2.1 At National Grid Reference SJ 03878 72454 marked 'Point A' on the map.

3. MEANS OF ABSTRACTION

- 3.1 Gravity flow to an open channel leading to a three-blade Archimedean screw turbine controlled by level sensors, automated control system and automated sluice gate.

4. PURPOSE OF ABSTRACTION

- 4.1 Power production.

5. PERIOD OF ABSTRACTION

- 5.1 All year.

6. MAXIMUM QUANTITIES OF WATER TO BE ABSTRACTED

- 6.1 487,814.4 cubic metres a day
136,588,032 cubic metres a year

At an instantaneous rate not exceeding 5,646 litres per second.

Note: A day means any period of 24 consecutive hours and a year means the 12 month period beginning on 1 April and ending on 31 March.

7. MEANS OF MEASUREMENT OF WATER ABSTRACTED

- 7.1 (i) The Licence Holder shall determine the quantity of water abstracted by reference to the kilowatt-hours generated, as measured by a kilowatt-hours meter multiplied by the conversion factor determined using the calculation checklist attached to this licence.
- (ii) The Licence Holder shall retain supporting documentation relating to details of the methodology and calculations used to convert electricity generated to the quantities abstracted and make them available to NRW on request.

8. RECORDS

- 8.1 (i) The Licence Holder shall record readings of the electrical output and the corresponding quantity of water abstracted at the same time each week, as determined using the calculation checklist attached to this licence or at such other intervals as may be approved by NRW in writing.
- (ii) The Licence Holder shall send to NRW a copy of the records required by Condition 8.1 (i) above within 28 days after 31 March in each year, and also

within 28 days of being so requested in writing by NRW.

- (iii) The Licence Holder shall keep all records for at least 6 years, and shall allow NRW to inspect them during all reasonable hours.

9. FURTHER CONDITIONS

9.1 For the purpose of this licence, references to 'hydropower scheme' shall mean all works that include the intake works consisting of a a new intake channel, a three-blade 3.35 metre diameter Archimedean screw turbine, level sensors, automated control system, automated sluice gate, 100 millimetre diameter orifice ornamental flow pipe with 10 millimetre spacing mesh screen, trash screen with 100 millimetre spacing, by-wash orifice and Larinier fish pass.

9.2 The Licence Holder shall construct, operate and maintain the hydropower scheme in accordance with the specifications and drawings:

- 'NWHP_ME_General_Arrangement 1 of 2', dated 15/08/2014,
- 'NWHP_ME_General_Arrangement 2 of 2', dated 15/08/2014,
- 'NWHP_ME_General_Layout 1 of 2', dated 09/08/2018, and
- 'NWHP_ME_General_Layout 2 of 2', dated 09/08/2018,

copies of which are appended to this licence, or such minor amendments to those documents that are accepted in writing by NRW prior to the date of commencement of construction.

9.3 The Licence Holder shall, as far as is reasonably practicable, ensure that no water flows through the turbine if the Licence Holder is unable to generate power.

9.4 The Licence Holder shall return all of the water abstracted in pursuance of this licence to the Afon Elwy at National Grid Reference SJ 03897 72439 marked 'Point Q' on the map.

9.5 No abstraction of water shall take place unless the rate of flow in the Afon Elwy immediately downstream of the authorised point of abstraction, marked as 'Point A' as specified in Condition 2.1, is equal to or greater than 565 litres per second and the abstraction shall not cause the flow immediately downstream of said abstraction point to fall below that rate.

9.6 No abstraction of water shall take place unless the Licence Holder has installed a trash screen with 100 millimetre spacings immediately upstream of the automated sluice gate.

9.7 (i) No abstraction of water shall take place unless the Licence Holder has installed a level sensor in the Afon Elwy at the point of abstraction, marked 'Point A', as specified in Condition 2.1.

(ii) The Licence Holder shall ensure that the level sensor is working at all times when abstraction is taking place.

(iii) The Licence Holder shall maintain the level sensor in such a condition, and if necessary replace it, so as to ensure that accurate measurements of levels are recorded at all times.

- 9.8 (i) The level sensors and the hydropower scheme's automated control system shall be used to secure the residual flow specified in Condition 9.5.
- (ii) In the event that the level sensor and/or automated control system fail the Licence Holder shall cease operation immediately and notify NRW of this fact.
- 9.9 No abstraction of water shall take place unless the rate of flow in the un-named leat at National Grid Reference SJ 03877 72456 is equal to or greater than 10 litres per second and the abstraction shall not cause the flow in the unnamed leat to fall below that rate.
- 9.10 (i) No abstraction of water shall take place for the purpose of hydroelectric power generation unless the fish protection modifications have been made to the Archimedean type turbine, as detailed in drawings 'Fish Protection Modifications 1' and 'Fish Protection Modifications 2' attached hereto.
- (ii) The Licence Holder shall maintain, repair and replace the fish protection modifications so that they remain effective in preventing damage to fish.
- 9.11 The Licence Holder shall ensure that during construction and any subsequent maintenance works to the hydropower scheme, the flow in the Afon Elwy is allowed to pass downstream unchanged in quantity and quality at all times.
- 9.12 The minimum value for the quantity of water authorised to be abstracted under this licence, as referred to in section 46(2A) Water Resources Act 1991, is 136,588,032 cubic metres per year.

ADDITIONAL INFORMATION

Note: the following information is provided for information only. It does not form part of the licence.

REASONS FOR CONDITIONS

The licence is time-limited to a date to reflect the timing of a future review of the catchment resources availability.

Conditions 7 and 8: the Licence Holder is required to record readings of the electrical output and the corresponding quantity of water abstracted to demonstrate compliance with the conditions of this licence and to provide information on actual water usage for water planning purposes.

Conditions 9.1 and 9.2: to ensure the hydropower scheme is constructed, operated and maintained in accordance with the drawings and specifications agreed by NRW during the determination of the licence.

Condition 9.3: to secure the proper and efficient use of water resources.

Condition 9.4: to ensure the abstraction can be classed as non-consumptive.

Conditions 9.5 and 9.11: to ensure a flow is maintained in the watercourse in order to maintain the riverine habitat for the conservation of the flora and fauna.

Condition 9.6: to prevent debris entering the Archimedean screw turbine.

Conditions 9.7 and 9.8: to achieve and demonstrate compliance with Condition 9.5.

Condition 9.9: to ensure a flow within the un-named leat is maintained at all times

Condition 9.10: to prevent damage to fish and eels passing through the Archimedean screw turbine.

Condition 9.12: to ensure compliance with Section 46(2A) of the Water Resources Act 1991.

IMPORTANT NOTES

No impoundment licence is required to facilitate the abstraction of water for the hydropower scheme authorised by this abstraction licence.

For the purposes of Conditions 9.2 and 9.8, the Licence Holder shall contact:

Natural Resources Planning Officer
 Natural Resources Planning Team
 Natural Resources Wales
 Maes y Ffynnon
 Penrhosgarnedd
 Bangor
 Gwynedd
 LL57 2DW

Tel: 0300 065 3000

Email: nrp.northmid@cyfoethnaturiolcymru.gov.uk

Water efficiency note

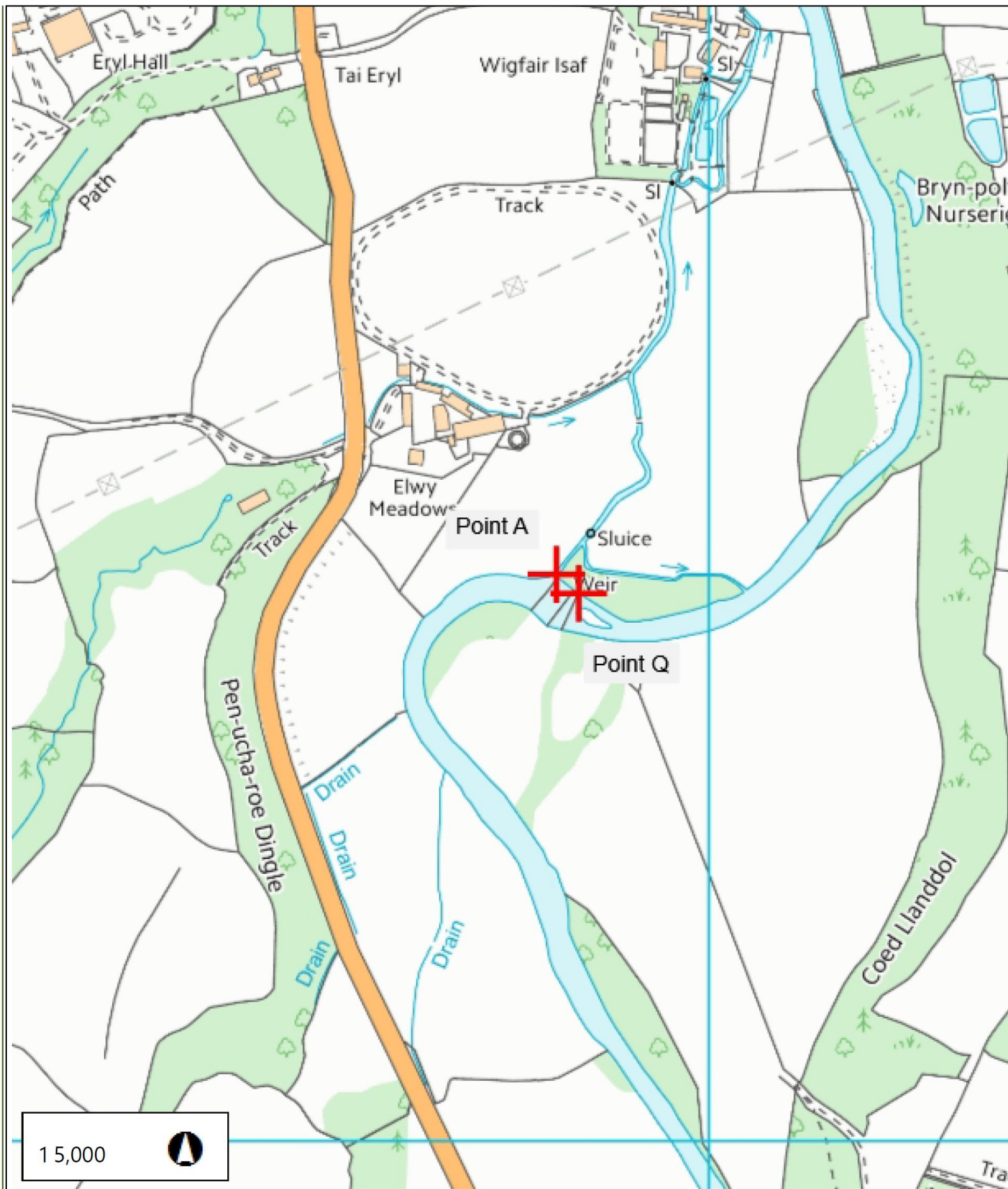
The Licence Holder should use water abstracted under the terms of this licence in an efficient manner. NRW may refer to its guidance on water efficiency (or equivalent guidance) in determining whether water is being used efficiently and may offer advice on any measures considered necessary to meet particular recommendations.

Screening

NRW will have regard to its Screening for Intakes and Outfalls: a Best Practice Guide (or equivalent guidance) in agreeing where, how and what type of fish screens should be installed and together with the results of any monitoring in determining whether the fish screens are properly effective and maintained, and in judging whether it is necessary to require repair or replacement of the fish screens.

Licence history

Licence Serial Number	Issue and Effective Date	Expiry Date	Summary of Changes
WA/466/0006/002	26/09/2014	31/03/2029	Original Licence issued to North Wales Hydro Power Limited.
WA/466/0006/002/V001	Issue: 31/08/2016 Effective: 02/08/2016	31/03/2029	Transfer of Licence Holder to Maes Elwy Hydro Limited.
WA/466/0006/002/V002	05/11/2018	31/03/2029	Variation to amend one existing and to include one new technical drawing.



0.3 0 Distance / 2 0.3 Kilo
metre
rs

British_National_Grid



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Wales**

MAP ACCOMPANYING LICENCE NUMBER / MAP I GYFEILIO TRWYDDED RHIF

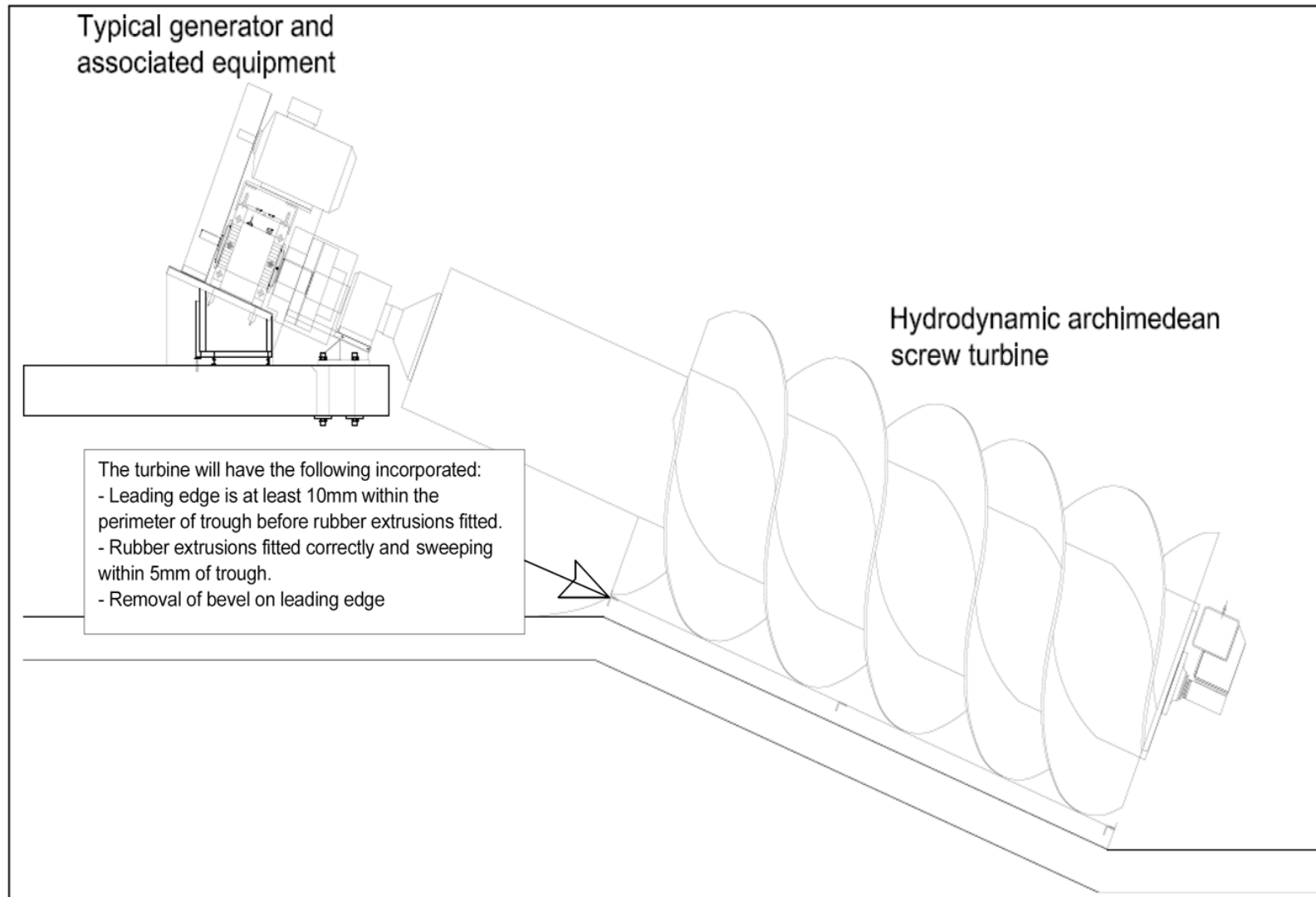
WA/466/0006/002/V002

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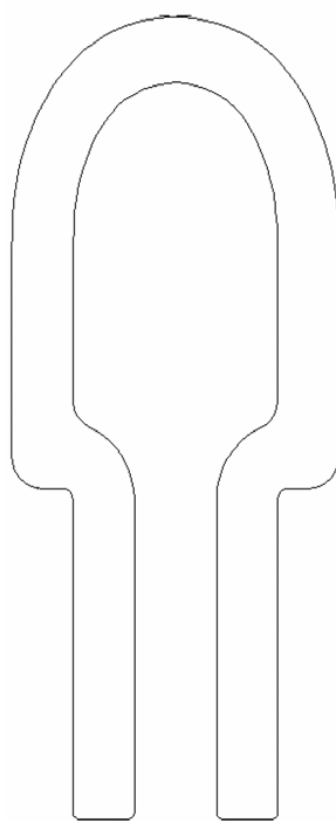


Fish Protection Modifications 1



Fish Protection Modifications 2

Not to scale



DRAWING 2.

Specification of EPDM rubber extrusion

35mm of compression with a force of 2Kg per cm² applied. All fixing bolts must be sub flush to the clamp plates.

PRELIMINARY DRAWING FOR
CONSENTING PURPOSES - NOT
FOR CONSTRUCTION

Notes:

Taken from OS Mastermap 1:1250
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License number 100020449

CONSTRUCTION NOTES

The hydro scheme will be constructed using a concrete formwork which will be integrated with the existing weir and improved where necessary.

Powerhouse

- Roofed with local slate
- Timber clad with internal noise insulation
- Vents to be baffled internally to further control any noise emission.
- Doors to be double skinned with noise attenuation built in.

Tailrace

To prevent scour and erosion of the river bed, a plunge pool will be created from locally sourced stone/boulders at the end of the tailrace of the screw and fish pass.

TOLERANCES

The final orientation and dimensions may vary marginally as site conditions dictate.

Project:

Maes Elwy Hydro
Scheme

Drawing Title:

General Arrangement

Drawing Number:

NWHP_ME_General_Arrangement

Client:

MAES ELWY HYDRO

Scale:

1:200 @ A3

Revision:

R

Sheet:

1 of 2

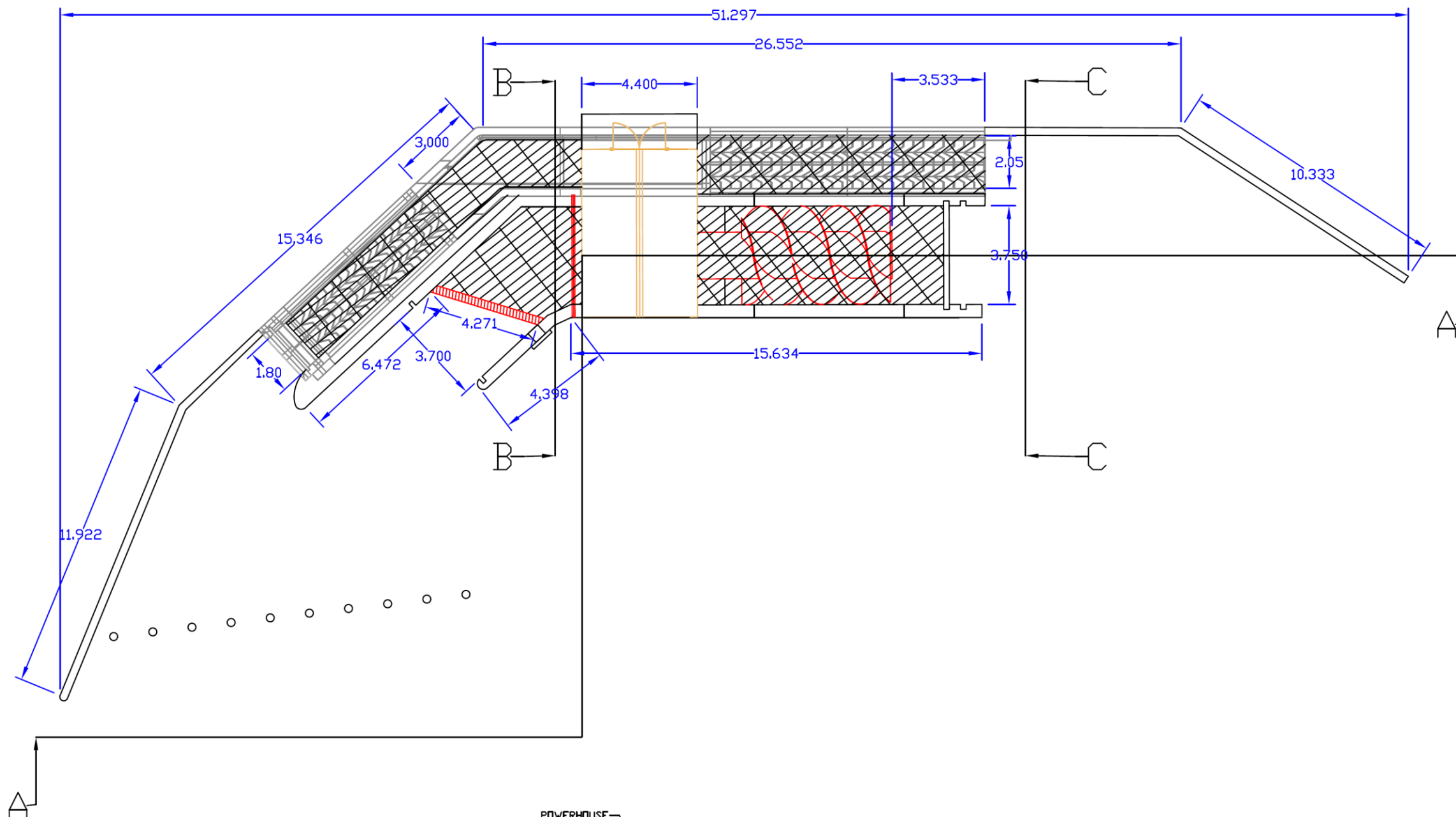
Drawn by:

AJF

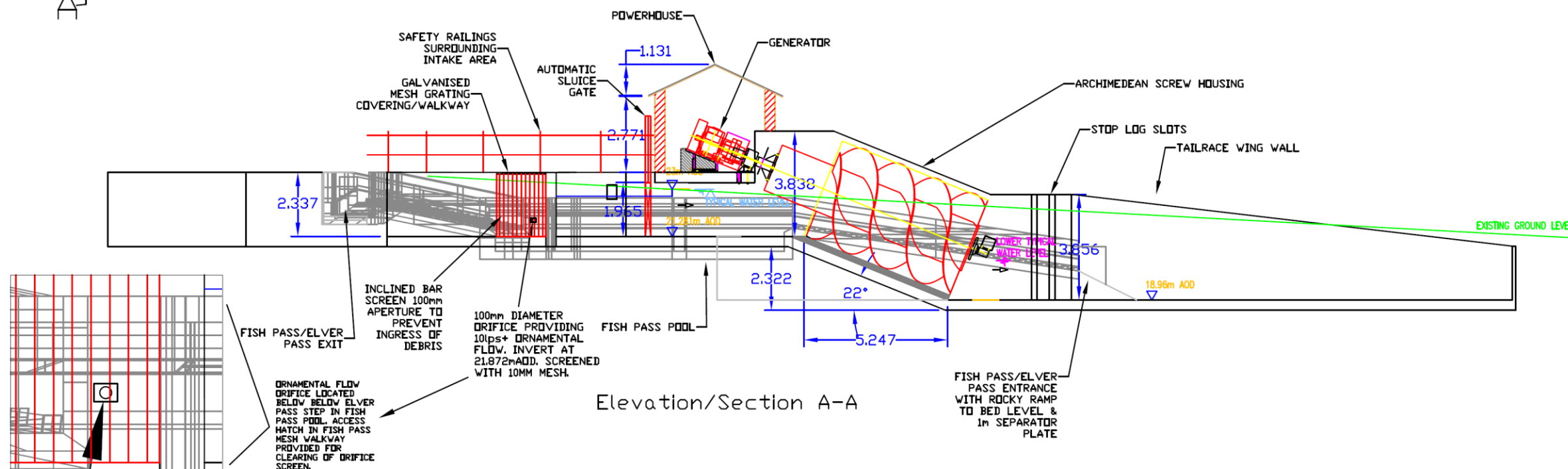
Date:

15/08/2014

PLAN VIEW



Elevation/Section A-A



PRELIMINARY DRAWING FOR
CONSENTING PURPOSES - NOT
FOR CONSTRUCTION

Notes:

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Project:

Maes Elwy Hydro
Scheme

Drawing Title:

General Arrangement

Drawing Number:

NWHP_ME_General_Arrangement

Client:

MAES ELWY HYDRO

Scale:

1:150 @ A3

Revision:

R

Sheet:

2 of 2

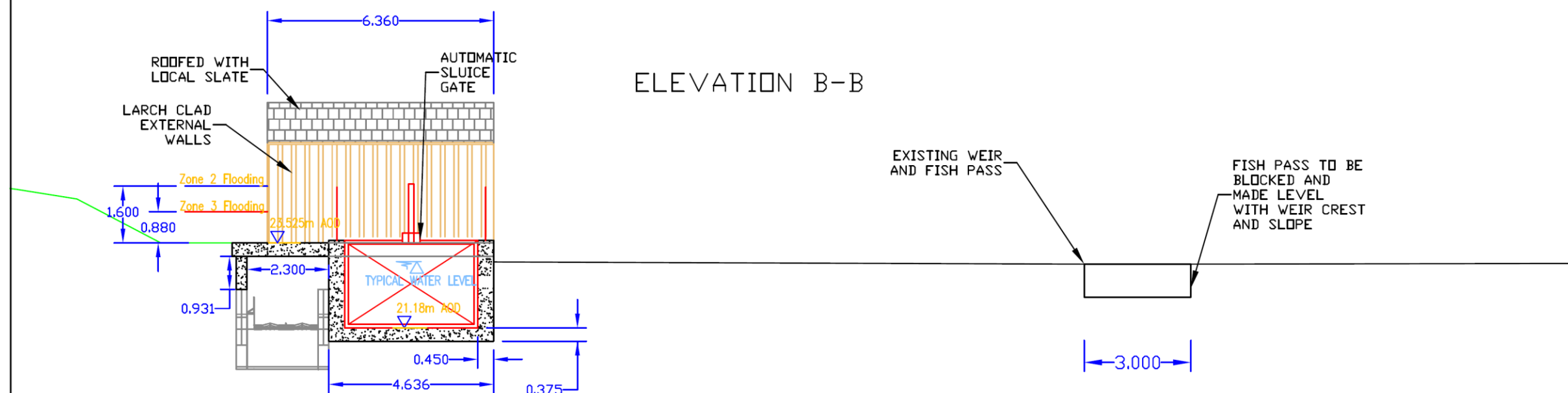
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Date:

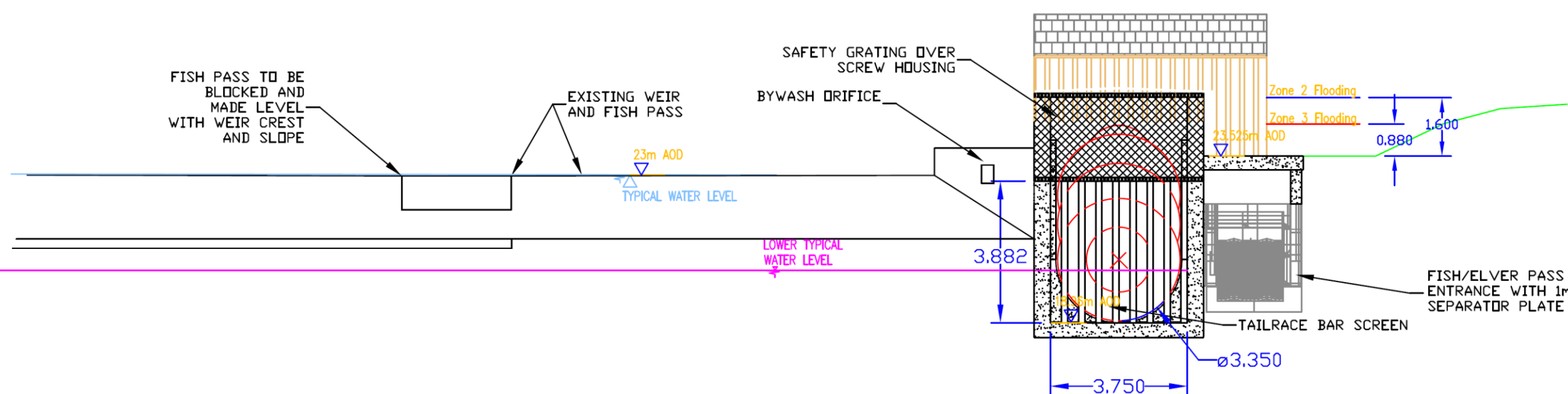
15/08/2014

ELEVATION B-B



Elevation/Section B-B

Elevation/Section C-C



PRELIMINARY DRAWING FOR
CONSENTING PURPOSES – NOT
FOR CONSTRUCTION

Project:

Maes Elwy Hydro

Client:

North Wales Hydro Power

Drawing Title:

General Layout

File Name:

NWHP_ME_General_Layout

Scale:

1:285 @ A3

Revision:

X

Sheet:

1 OF 2

Drawn by:

DM

Date:

09/08/2018

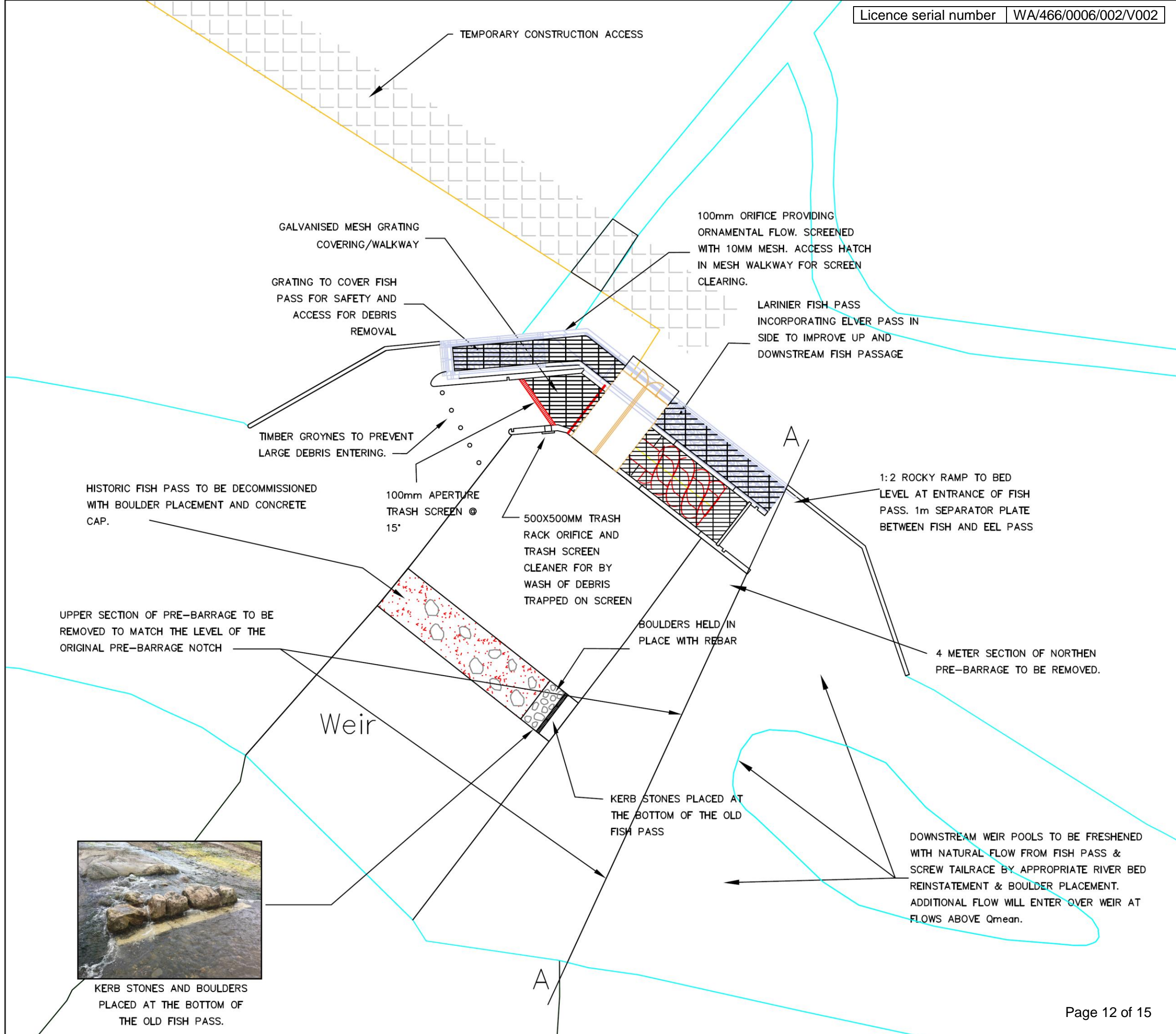
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TOLERANCES

The final orientation may vary marginally as site conditions dictate.

Revisions

Rev	Description	Approved	Issued



PRELIMINARY DRAWING FOR
CONSENTING PURPOSES – NOT
FOR CONSTRUCTION

Project:
Maes Elwy Hydro

Client:
North Wales Hydro Power

Drawing Title:
General Layout

File Name:
NWHP_ME_General_Layout

Scale: 1:150 @ A3	Revision: X	Sheet: 2 OF 2
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Drawn by: DM	Date: 09/08/2018
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TOLERANCES

The final orientation may vary marginally as site conditions dictate.

Revisions

Rev	Description	Approved	Issued

Sectin A—A

Upper section of Pre-Barrage to be removed to
match the level of the original Pre-Barrage Notch

Original Notch

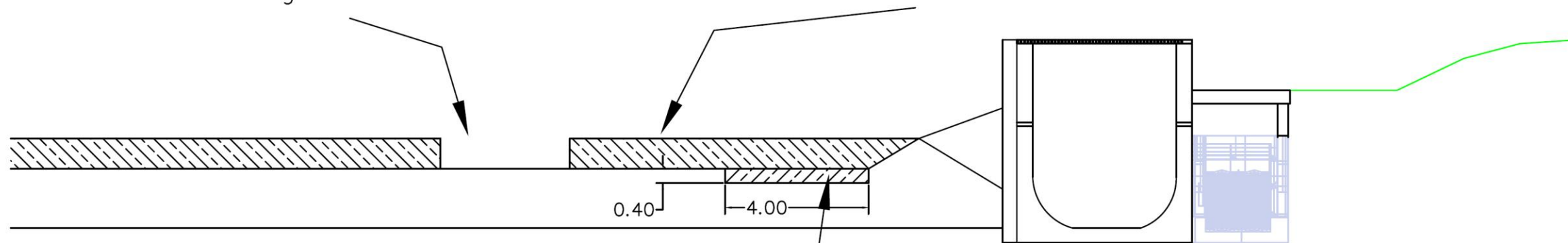


Photo showing Northern
Pre-Barrage following removal
of 4m section.

Calculation Checklist

This checklist shall be used to record the site data and calculate the Hydro Abstraction Factor for the site (HAF_{site}) to allow conversion of electrical output to quantities abstracted. The HAF_{site} is the amount of water used in m^3 per kWhr generated for any period.

Site Data	
Site name	
Address	
Licence serial No.	
Contact name	
Contact telephone	
Contact email	
Turbine manufacturer	
Turbine type	
Turbine serial no.	
Number of jets (where relevant)	

Performance Data		
Parameter	Value	How was the parameter determined?
Net operating head of the system at maximum power output ($H_n (P_{max})$) in metres		
Turbine/water wheel efficiency at maximum power output ($e_{turbine/water\ wheel\ (P_{max})}$)		
Transmission system efficiency at maximum power output ($e_{transmission\ (P_{max})}$)		
Generator efficiency at maximum power output ($e_{generator\ (P_{max})}$)		

Calculation of overall system efficiency of the rotating parts of the hydro system, at maximum power output ($e_{system\ (P_{max})}$)

$$e_{system\ (P_{max})} = e_{turbine/water\ wheel\ (P_{max})} \times e_{transmission\ (P_{max})} \times e_{generator\ (P_{max})}$$

$$= \boxed{} \times \boxed{} \times \boxed{}$$

$$e_{system\ (P_{max})} = \boxed{}$$

Calculation of HAF_{site}

HAF_{site} = Hydro Abstraction Factor for the site in question

$$= 366.972 / (H_n (P_{max}) \times e_{system\ (P_{max})})$$

$$= 366.972 / (\boxed{} \times \boxed{})$$

$$= \boxed{} \text{ (m3/kWh)}$$

Where:

$H_n (P_{max})$ = net head at max. power.

366.972 = a constant in order to bring the final HAF into the correct unit of $m^3/kWhr$ (it is arrived at by dividing the number of seconds in an hour (3600) by gravity ($9.81\ m/s^2$))

The volume of water abstracted for any period (V_{period}) can then be calculated by simply multiplying the HAF_{site} by the number of kiloWatt hours generated thus:

$$V_{period\ (m3)} = kWh_{period\ (kWh)} \times HAF_{site\ (m3/kWh)}$$

See example:

(kWh is a measure of energy, whilst kW is a measure of power: at full efficiency, a 50 kW

turbine will produce 50 kWh of energy in one hour, 100 kWh in two hours, 150 kWh in three hours etc.).

Performance Data		
Parameter	Value	How was the parameter determined?
Net operating head of the system at maximum power output ($H_n(P_{max})$) in metres	150	Site survey
Turbine/water wheel efficiency at maximum power output ($e_{\text{turbine/water wheel}}(P_{max})$)	0.9	From manufacturer
Transmission system efficiency at maximum power output ($e_{\text{transmission}}(P_{max})$)	0.85	From manufacturer
Generator efficiency at maximum power output ($e_{\text{generator}}(P_{max})$)	0.85	From manufacturer

Calculation of overall system efficiency of the rotating parts of the hydro system, at maximum power output ($e_{\text{system}}(P_{max})$)

$$e_{\text{system}}(P_{max}) = e_{\text{turbine/water wheel}}(P_{max}) \times e_{\text{transmission}}(P_{max}) \times e_{\text{generator}}(P_{max})$$

$$= 0.9 \times 0.85 \times 0.85$$

$$e_{\text{system}}(P_{max}) = 0.65$$

Calculation of HAF_{site}

HAF_{site} = Hydro Abstraction Factor for the site in question

$$= 366.972 / (H_n(P_{max}) \times e_{\text{system}}(P_{max}))$$

$$= 366.972 / (150 \times 0.65)$$

$$= 3.764 \quad (\text{m}^3/\text{kWh})$$

The volume of water abstracted for any period (V_{period}) can then be calculated by simply multiplying the HAF_{site} by the number of kiloWatt hours generated thus:

$$V_{\text{period}}(\text{m}^3) = \text{kWh}_{\text{period}}(\text{kWh}) \times HAF_{\text{site}}(\text{m}^3/\text{kWh})$$

If, for example your total export of electricity for the period was 68400 kWh, then you would have abstracted a total volume of water of:

$$V_{\text{period}}(\text{m}^3) = 68400 \text{ kWh} \times 3.764 \text{ m}^3/\text{kWh} = 257457.6 \text{ m}^3$$

**Would you like to find out more about us,
or about your environment?**

**Then call us on
0300 065 3000 (Mon-Fri 9-5)**

**email
enquiries@naturalresourceswales.gov.uk**

**or visit our website
www.naturalresourceswales.gov.uk**

**incident hotline 0300 065 3000 (24hrs)
floodline 0345 988 1188**



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