FORM WRD: Application for a new abstraction licence or a technical variation to an abstraction licence

Water Resources Act 1991, Environment Act 1995, The Water Resources (Abstraction and Impoundment) Regulations 2006, The Natural Resources Body for Wales (Functions) Order 2012

Cyfoeth Naturiol Cymru Natural Resources Wales

1. Application type

New full abstraction licence	☒	Give existing licence serial number and/ pre-application reference number
New temporary abstraction licence	☐	
New licence to transfer water	☐	WA/057/0031/004
Renewal of a time-limited abstraction licence	☐	
Technical variation to an abstraction licence	☒	

For hydropower abstractions, specify the capacity (in kilowatts) of your scheme.
25kW or less ☐ >25 to 50kW ☐ >50 to 100kW ☐ >100kW ☐

2. Linked licences

2.1 Does your proposal involve water rights trading?
No ☒ Yes ☐ If yes, provide licence serial number(s)

2.2 Is the licence (to be) aggregated with any other licences?
No ☐ Yes ☒ If yes, provide licence serial number(s) WA/057/0031/004

3. Abstraction details

Provide details of all points of abstraction. Details of abstraction location(s) should correspond with any maps submitted.
If necessary, continue on a separate sheet and tick here to show that you have done this ☐

Abstraction location name / reference	Type (single point / reach)	National Grid Reference (12 digit)	If a reach, downstream National Grid Reference (12 digit)
Ambulance Station Catch-pit (proposed addition to current licence)	Single point groundwater collector	305063 178937	n/a
Borehole 1 (included on current licence)	Single borehole	304707 178093	n/a
Borehole 2 (included on current licence)	Single borehole	304304 178300	n/a
Hensol Lake (proposed abstraction, subject to separate application)	Surface water abstraction	304651 179057	n/a

4. Means of abstraction

Detail the structure and equipment involved in the abstraction process. If this information is detailed in a supporting document, provide the document reference. For groundwater abstractions, include borehole depth and diameter and provide details of screening and lining. If necessary, continue on a separate sheet and tick here to show that you have done this. ☒

Ambulance Station Catch-pit. Full details of the Catch-pit abstraction are provided in *a technical memo* at the base of this document.

Boreholes 1 & 2. Downhole submersible pumps in each.

Hensol Lake. Surface water abstraction.

5. Abstraction quantities

Provide details of the abstraction quantities and periods proposed, including any deregulated abstractions (< 20 cubic metres per day) you currently have. Details of abstraction locations should correspond with any maps submitted.

Abstraction location name / reference	Purpose which water will be used for	Abstraction period (state 'all year' or give months)	Maximum annual abstraction volume (cubic metres)	Maximum daily abstraction volume (cubic metres)	Maximum hourly abstraction volume (cubic metres)	Number of hours of abstraction per day	Peak abstraction rate (litres per second)
Ambulance Station Catch-pit (proposed addition to current licence)	Sports-pitch irrigation	1 Mar – 30 Nov incl.	26,000	100	8.33	24	2.31
Borehole 1 (included on current licence)	Commercial – Hotel use	All year	44,165	121	9.79	24	2.72
Borehole 2 (included on current licence)	Spray irrigation	1 Feb – 30 Nov incl.	50,470	178	9.00	24	2.5
Hensol Lake (proposed abstraction, subject to separate application)	Sports-pitch irrigation	1 Mar – 30 Nov incl.	78,000	300	25.00	24	6.93
		Total	198,635	699	52.12		

6. Calculations and supporting information

Please provide further details of your intended use of water, including calculations in support of the quantities you have requested, your operational regime and any management agreements. See Guidance Note WRX for details of what is required. If your proposal involves the provision of a residual flow via a notch or orifice, provide information on how this has been calculated.

If necessary, continue on a separate sheet and tick here to show that you have done this. ☒

Vale Hotel, on behalf of the Welsh Rugby Union, the Football Association of Wales and Cardiff Football Club, have installed and are installing semi-artificial hybrid grass/plastic/nylon training pitches, brand-named Desso and Siss.

The total area for irrigation is projected to be **7 Ha (70,000 m^3)**.

The irrigation requirement is **35 mm (0.035 m) per week** – this is slightly higher than standard grass pitches as the water is used for purposes other than to fulfil evapotranspiration, e.g. player well-being.

During the watering period this gives a demand of 2,450 m^3/week (350 m^3/d). Adding c. 15% contingency gives a demand of **400 m^3/d**.

It is proposed to split this demand between the Ambulance Station Catch-pit (100 m^3/d, the subject of this application) and a surface water abstraction from Hensol Lake (300 m^3/d, the subject of a separate, but related, application).

The watering period is from March 1st to November 15th **(260 days) each year** which, multiplied by the daily demands above gives the annual abstraction volumes in the table above.

The maximum hourly abstraction volumes in the table above are calculated assuming a 12 hour/day abstraction period. To be clear, any abstraction would be managed, in terms of hours pumping, to fulfil the maximum daily and annual licensed limits.

n.b. it is assumed that the text above also fulfils the requirements of Section 7.

7. Industry-specific requirements

Complete the relevant table in line with the purpose of your proposal to demonstrate a justification of need for the quantities proposed. For uses not covered here or to provide further details, please use a separate sheet and tick here to show that you have done this ☐

7.1 For agricultural use:

Crop type	Soil type (for multiple soil types, indicate approximate split)	Maximum area of crop to be irrigated annually (hectares)	Maximum annual depth of irrigation to be applied (millimetres)
e.g. Carrots	*Silty clay*	*10*	*90*

Livestock type	Number of animals	Maximum daily quantity of water used (cubic metres)	Comments
e.g. Sheep	*200*	*0.005 per animal*	*Drinking water*
Provide details of any additional requirements (washing / cleaning)			

7.2 For golf course irrigation:

Feature	Maximum area to be irrigated daily (hectares)	Maximum depth of water to be applied daily (millimetres)
e.g. Greens	*0.9*	*220*
Tees		
Greens		
Fairways		
Others		

7.3 For industrial use:

Industry sector or process type	Water use per unit produced (state units)	Maximum units produced per year
e.g. Ice cream	*1.9 cubic metres per tonne of ice cream*	*10,000 tonnes*

7.4 For hydropower:
If you have submitted this information as part of your pre-application enquiry and no changes have been made to your proposal in the meantime, you are not required to provide these details again.

% abstraction and zone applied for (see HGN2)	Average gradient of depleted reach (%)	Catchment size above abstraction point (kilometres square d)	Net head between abstraction and discharge points (metres)
N/a	N/a	N/a	N/a
Turbine efficiency (%)	**System efficiency (%)**	**Maximum power output (kilowatts)**	**Annual capacity (kilowatt hours)**
N/a	N/a	N/a	N/a

State the length of depleted reach (in metres) N/a

Provide the flow data (in cubic metres per second) & ratios specified below:	
Q95	N/a
Q10	N/a
Qmean	N/a
What is the ratio of Q95:Qmean?	N/a
What is the ratio of Q10:Qmean?	N/a

Please send us a copy of the full flow duration curve for the site and confirm the method used to derive this. If you have used modelling software such as LowFlows, please provide us with a copy of the output (graph, data and catchment map) including the Long Term Average rainfall.

What low flow protection* do you propose to maintain in the depleted reach when the hydropower scheme is operating (in m^3/s)?
* Low flow protection is the flow rate above which abstraction can begin and is separate to the abstraction % take, see HGN2 for details.

N/a

8. Means of measurement

State how you intend to measure abstracted quantities at each abstraction point.
Meter ☒ Power Generated ☐ Other ☐
If other, please specify

9. Water efficiency

Describe all steps you have taken or intend to introduce to ensure efficient use of water, such as water storage, re-use or conservation provision. If necessary, continue on a separate sheet and tick here to show that you have done this. ☐

Sports pitches will only be watered as necessary.

It is also worth noting that irrigation water which is not evapotranspired will return to groundwater, although the abstraction has been assumed to be 100% consumptive for this application.

10. Fish and eel considerations (surface water abstractions only)

10.1 Confirm the fish species present at your site. If you are submitting a survey or report with your application, please tick here to show that you have done this. ☐

N/a

10.2 Does your proposal include measures to safeguard fish and eels? Only provide details of outfall screening if abstracted water is to be discharged back into a watercourse.

	Intake	Outfall
Type of fish screen	N/a	N/a
Screen aperture size (mm)	N/a	N/a

11. Discharge details

11.1 If you intend to return any of the abstracted water to the environment, provide details below. Details of discharge location(s) should correspond with any maps submitted.

Discharge location name / reference	National Grid Reference of discharge point (12 digit)	Total volume to be discharged (cubic metres)	Environmental Permit for Water Discharge Activity number (if applicable)
N/a	N/a	N/a	N/a

11.2 Provide a description of the structure and equipment involved in discharge.

N/a

12. Other abstractors / water users

Provide details of nearby abstractors or users of water who could be affected by your proposal. This should include deregulated users (exempt activities or abstractions < 20 cubic metres per day), anglers and canoeists.

None

13. Planning application

Have you sought advice on your planning application?

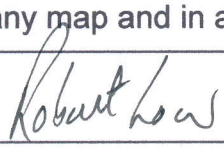
No ☒ Yes ☐

If yes, submit a copy of the Planning Authority's response.

14. Declaration

Please see Guidance Note WRX for details of who can sign this section and note the information in that document relating to the Data Protection Act 1998.

By signing below, you are declaring that as far as you know and believe the information given in this form, on any map and in any supporting or additional information, is true.

Signed	
Print name	Rob Low
Position	Agent to applicant (Hydrogeologist, Rigare Ltd)
Date	4th December 2019

Application Checklist

Please tick the following checklist items to indicate that you have included the required information. If any sections of the form are left blank and no supporting information submitted, where we have insufficient information to make a decision on your application, we will return your application to you.

Essential:

Form WRA completed ☒

Map showing applicant's land boundary with all abstraction and discharge point(s) clearly marked (**see Form WRA**) ☒

Evidence of negotiations of expected access rights, if applicable ☐

State number of continuation sheets (enter 0 if none included) 5

Where relevant:

Letter of authorisation from the applicant, allowing the agent to act as signatory (**see Form WRA**) ☒

Form WRE completed, if your proposal also requires an impoundment licence ☐

Further information requested in our pre-application response letter to you ☐
For hydropower applications, full flow duration curve for the site, confirmation of the method used to derive this and a copy of the output (graph, data and catchment map) including the Long Term Average rainfall, where available ☐
Planning Authority response, where available ☐
Additional supporting information - please list below:

Rigare
Groundwater and Wetland Science

Technical Memorandum

Project #: 1710	Project: Vale of Glamorgan Resort	Client: Vale of Glamorgan Resort
Document: see footer	Author: Dr Rob Low	Date: 4th December 2019
Subject: **Details of, and hydro(geo)logical impact assessment for, the Ambulance Station Catch-pit groundwater abstraction**		

1 Introduction

The Ambulance Station Catch-pit abstraction was, historically, a water supply for a large hospital within the current grounds of the Vale Resort. A record for the Catch-pit 'borehole' is available on the British Geological Survey website[1], under the code ST07NE211, and is reproduced as Figure 1 below. The capacity of the abstraction is given in the record as 60 gallons per minute (394 m^3/d). The abstraction was renovated recently, and has been operated at under the 20 m^3/d abstraction licensing threshold, with the water used for irrigating sports pitches within the Vale Resort. More water is now required to irrigate latest-generation grass sports pitches (see Form WRD).

2 The Catch-pit abstraction

A diagram showing the arrangement of the abstraction, along with photographs of the key elements, is provided as Figure 2 below. Groundwater flows from a shallow catch-pit, by gravity, to historical underground tanks. It is lifted from here, by pumps, to a nearby storage tank. It is pumped from this storage tank to the supply point.

3 Hydro-environmental impact assessment

3.1 Hydro-environmental setting

The abstraction is located in a small, flat area of woodland, scrub and grassland to the west of Hensol Villas, Hensol, and east of the Vale Resort (Figure 3 below). More locally the catch-pit is located east of an elongate, primarily north-south oriented, lake, Mill Pond (Figure 4). It is also on the northern bank of the outlet stream to Mill Pond which flows into the River Ely c. 750 m to the north-east.

Immediately west of the catch-pit there is a small area of peat which, during site visits in November 2019 presented very soft ground conditions, and was slightly quaking. This implies that there is a component of upwards groundwater discharge locally and, given the presence of at least 0.5 m thickness of peat, this appears to have been the case for a long period of time. It almost certainly demonstrates that a water table which is at or very close to the surface is a natural condition locally. There is some evidence of a shallow drainage channel leading from the area of peat to the stream, and the catch-pit was probably constructed to capture this groundwater discharge resource historically.

3.2 Water consumption

The abstracted water is pumped up-catchment, to the irrigated sports pitches. There is a possibility that some irrigation water might pass downwards through the root zone to recharge the saturated zone (i.e. return to groundwater), and therefore not be 'consumed' by the irrigation use, but a conservative assumption that the abstraction is wholly consumptive is being made.

[1] http://mapapps.bgs.ac.uk/geologyofbritain/home.html

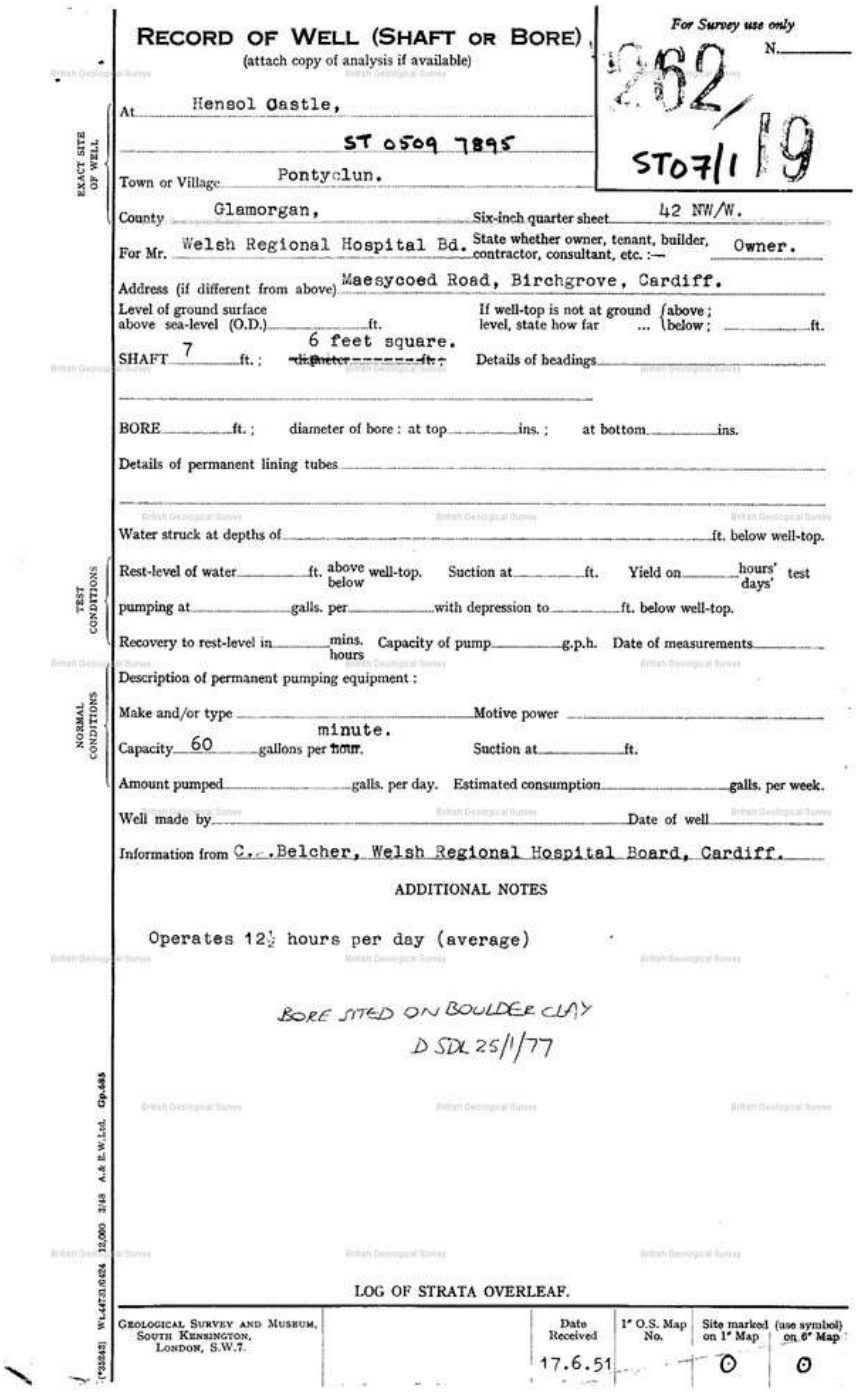
3.3 Hydrogeological impact assessment

Hydrogeologically, the catch-pit represents a drain which draws the water table down locally by around 0.5 m, from at or close to the ground surface down to the intake level of the outlet pipe in the catch-pit. Given that the catch-pit appears to be located in an area of upwards groundwater discharge it is considered; 1) very unlikely that this drawdown propagates for any significant distance away from the abstraction, and therefore 2) that the risk that the abstraction could have any significant impact on the groundwater system locally is negligible.

Groundwater is almost always abstracted wholly at the expense of natural groundwater discharge, and it is important for abstraction impact assessment to consider what these natural discharges will probably be reduced. In this case it is thought likely that the reduction in natural discharge will cause a reduction in flow to the stream immediately to the south of the catch-pit, through a reduction in local surface flows from the area of peat to the stream, and/or a reduction in direct subsurface flows to the stream.

Dr Rob Low, 4th December 2019.

rob@rigare.co.uk, 07866 552926.



RECORD OF WELL (SHAFT OR BORE)
(attach copy of analysis if available)

For Survey use only
N.
262/
ST07/19

EXACT SITE OF WELL

At Hensol Castle,
ST 0509 7895
Town or Village Pontyclun.
County Glamorgan, Six-inch quarter sheet 42 NW/W.
For Mr. Welsh Regional Hospital Bd. State whether owner, tenant, builder, contractor, consultant, etc. :— Owner.
Address (if different from above) Maesycoed Road, Birchgrove, Cardiff.
Level of ground surface above sea-level (O.D.) ft. If well-top is not at ground level, state how far ... {above; below; ft.
SHAFT 7 ft.; ~~diameter ft.;~~ 6 feet square. Details of headings
BORE ft.; diameter of bore: at top ins.; at bottom ins.
Details of permanent lining tubes
Water struck at depths of ft. below well-top.

TEST CONDITIONS

Rest-level of water ft. above/below well-top. Suction at ft. Yield on hours'/days' test pumping at galls. per with depression to ft. below well-top.
Recovery to rest-level in mins./hours Capacity of pump g.p.h. Date of measurements
Description of permanent pumping equipment:

NORMAL CONDITIONS

Make and/or type Motive power
Capacity 60 gallons per ~~hour~~ minute. Suction at ft.
Amount pumped galls. per day. Estimated consumption galls. per week.
Well made by Date of well
Information from C. C. Belcher, Welsh Regional Hospital Board, Cardiff.

ADDITIONAL NOTES

Operates 12½ hours per day (average)

BORE SITED ON BOULDER CLAY
D SDL 25/1/77

LOG OF STRATA OVERLEAF.

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.		Date Received	1" O.S. Map No.	Site marked on 1" Map	(use symbol) on 6" Map
		17.6.51		O	O

W1.44723/0424 12,000 2/48 A.& E.W.Ltd. Gp.585

Figure 1. BGS record for Borehole ST07NE211

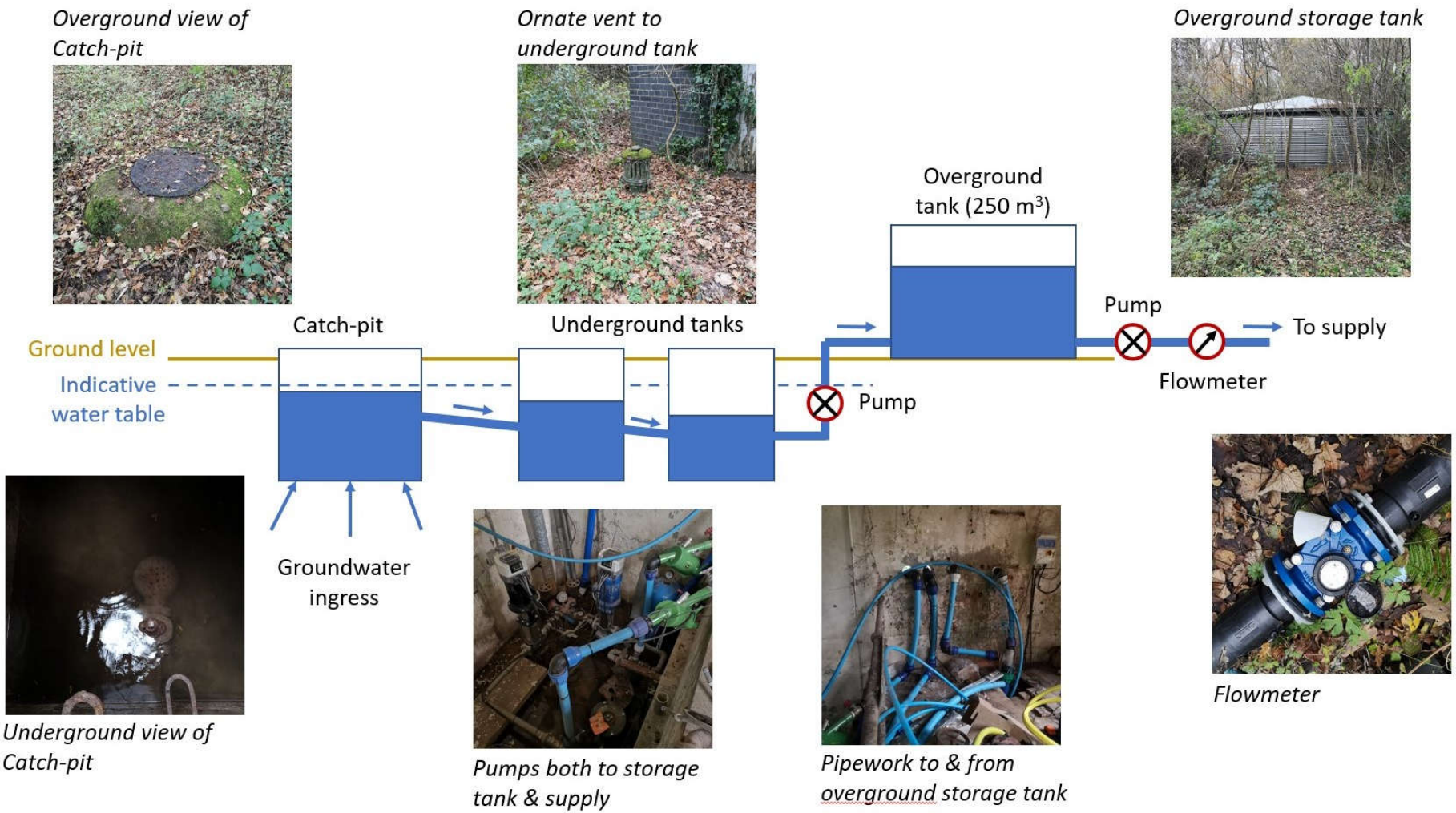


Figure 2. Design and operation of the Ambulance Station Catch-pit groundwater abstraction

Figure 3. Small-scale map showing features around Catch-pit abstraction

Figure 4. Left; outlet stream to Mill Pond, immediately south of catch-pit. Right; Mill Pond with dam wall/weir in foreground.