WJ UK

Expert in Water Management

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Hydrogeological Impact Assessment

Project Name: WEPA Vesta Papermill Building

Client: WEPA UK

Project No.: P3672

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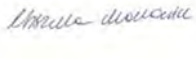
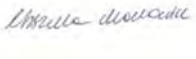
Document Reference & Revision	**Issued:**	**Prepared:**	**Checked:**	**Approved:**
P3672-WEPA-HIA-01 Rev0 Vesta Papermill, Bridgend	18/07/2025	C Denny 	U Markowicz 	U Markowicz 

Amendment Record			
Date:	**Section No:**	**Change Description:**	**Changed By:**

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1. THE SITE

1.1. Introduction

This report provides an assessment of the hydrogeological impact of the proposed temporary dewatering system at the WEPA Papermill near Bridgend, Wales. It has been prepared in support of an application to Natural Resources Wales for an abstraction licence associated with the scheme.

Ground conditions on site comprise a sequence of superficial deposits consisting of Clay, Sand and Gravel beds, underlain by the Pennant Sandstone Formation, also known as South Wales Coal Measures consisting of sandstone, siltstone, mudstone and sporadic coal seams. The superficial deposits and Coal Measures are considered to form two distinct aquifers with separate groundwater levels.

The below-ground construction works include two key elements: the installation of bearing piles and the construction of pile caps. Excavation for pile caps will be carried out within the superficial deposits, with the deepest pile caps to be constructed below the groundwater level within these deposits. Due to variable composition of the superficial layers — including interbedded sands, gravels, and clays — groundwater inflows are expected to be managed using conventional sump pumping techniques. The bearing piles will extend into the underlying Coal Measures. Groundwater levels within the Coal Measures have been recorded at approximately 79.0 mOD, less than 100 metres south of the proposed excavation and piling area. As such depressurisation of artesian conditions within the bedrock has been recommended prior to the commencement of foundation piling activities. The objective is to lower groundwater pressure in the Coal Measures to the proposed platform level of 74.1 mOD. This will be achieved using a ring of pumped wells installed around the piling platform to lower groundwater levels in the bedrock.

A pumping test and dewatering has been undertaken to facilitate the construction of 'Department C', 100m south of the Paper Machine Hall. An abstraction application was required for that phase of dewatering and was supported by a Hydrogeological Impact Assessment and Water Feature Survey.

This current hydrogeological impact assessment is based on a conceptual model that incorporates the site's geological profile, hydrogeological parameters, the proposed piling works and the proposed abstraction wells.

The site is located at WEPA Papermill off of the A4063, CF34 9RS, see Figure 1.

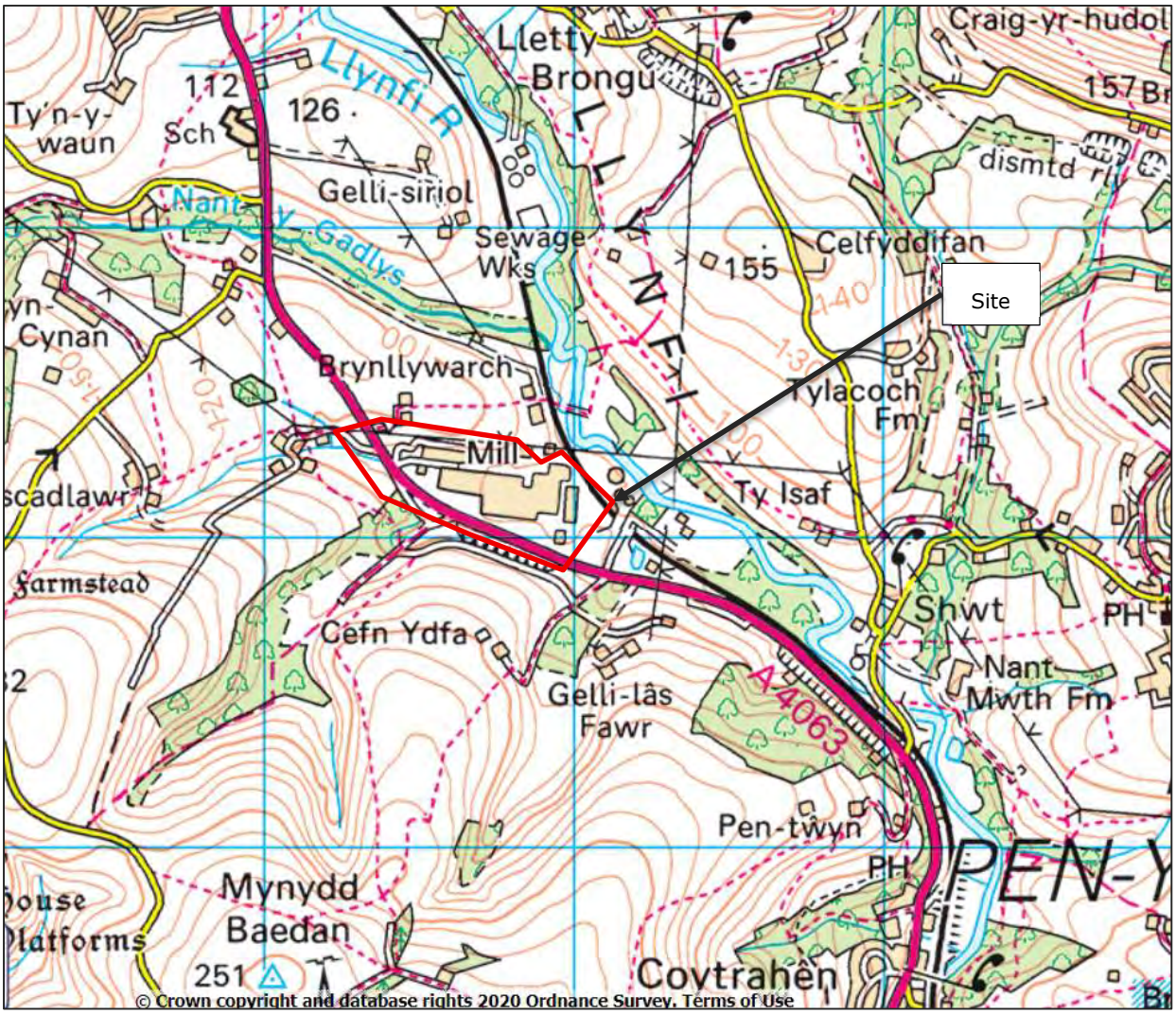

Figure 1) Site Location

2. HYDROGEOLOGICAL IMPACT ASSESSMENT

In the development of this Hydrogeological Impact Assessment (HIA) we have undertaken a desk study of the readily available information. This information has been gathered from various sources including the available Site Investigation reports (SI), The British Geological Survey (BGS), Environment Agency (EA), National Resources Wales (NRW) and Ordnance Survey (OS).

Step 1 – Regional Water Resource Status

The site is located within the Swansea Bay Catchment Abstraction Management Strategy (CAMS Directive), South Wales Central Operational Area (NRW), Western Wales River Basin District and Tawe to Cadoxton Groundwater Managerment Catchment (Water Framework Directive (WFD). The area is characterised

predominantly by agricultural and rural land. The landscape features a series of valleys that extend from the Brecon Beacons National Park toward the Bristol Channel. Surface water features in the catchment support both fisheries and conservation initiatives. The surface water features in the area support fisheries and conservation projects. The River Llynfi is located immediately east of the site and is a tributary of the River Ogmore, connecting in the town of Sarn to the south. According to available data, surface water resources in the area are currently available for abstraction.

The site is located within the South Wales Coal Measures groundwater body, a Secondary A type aquifer. The overall status for the body in 2015 was good (Swansea Bay Licencing Strategy), however its groundwater vulnerability index is listed as medium to high (NRW Interactive Map Viewer), as shown in Figure 2:

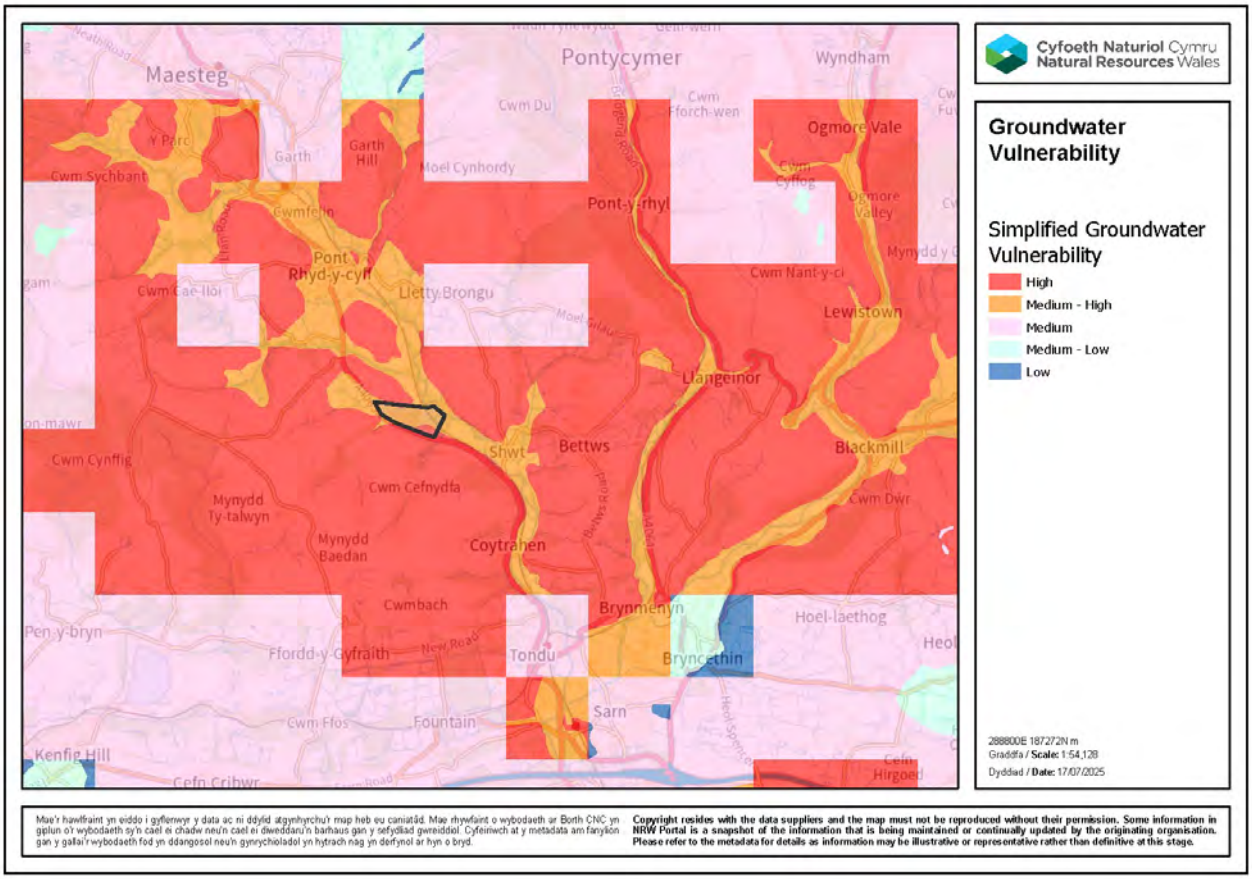

Figure 2) Groundwater Vulnerability

The Llynfi River is located approximately 280m to the north-east of the works area. A smaller stream, Nant Gwyn, has been culverted beneath site, flows east into the river approximately 400m east of the site. Further details of water features in the vicinity of the site are given in Appendix C: Water Features Survey.

Step 2 – Conceptual Model

A conceptual model has been developed based on the available site investigation information, pumping test and dewatering data gathered on site as follows:

Step 2.1 - Geology

The site investigation (24049/R1 issued November 2024 by Spectrum Geo Services) information indicates the following sequence of stratification:

Table 1 Summary of ground conditions

Unit	Top Level (mOD)	Depth (mbgl)
Top of Made Ground	75.3 to 75.5	0.0
Superficial Deposits: Alluvium	71.0 to 73.3	2.2 to 4.5
South Wales Coal Measures – Mudstone/Siltstone/Sandstone	61.8 to 62.8	12.7 to 13.5
Proven To	45.3 to 46.0	29.5 to 30.0

A section through the proposed basement showing the ground profile is given in Appendix A: Cross-section. The maps referenced in this section were generated using the British Geological Survey (BGS) GeoIndex service can be found in Appendix D.

The superficial geology, as mapped by the British Geological Survey (BGS GeoIndex) can be seen in Figure 3. It indicates that Alluvium follows the natural and culverted watercourses across the site. Additionally, the Devensian Till deposits follow a similar depositional pattern but is more widely distributed across the area.

Alluvium is generally described as a loosely consolidated soft sediment deposited in fluvial environments of varying energy levels, consisting of clay, silt, sand and gravel (BGS Lexicon). Site investigations found the alluvium to vary spatially across the site. Beds of clay, as well as gravel and sand were encountered.

Till is generally described as a diamicton, a glacial deposit consisting of unsorted heterogeneous mixture of clay, sand, gravel and boulders of varying shapes and sizes (BGS Lexicon). Till deposits were not identified within the immediate footprint of the proposed works, previous site investigations found the Till in the boreholes around 'Department C' to the south.

Figure 3 Superficial Deposits 1:50,000 scale (from BGS)

The bedrock geology as mapped by the British Geological Survey (BGS GeoIndex) can be seen in Figure 4. It shows that the site is underlain by the Pennant Sandstone Formation, a part of the Warwickshire Group, which overlies the South Wales Coal Measures Group. There are three main strata types forming the individual members of the formation: sandstone, siltstone and mudstone. The Pennant Sandstone Formation at the site is represented by the Brithdir Member.

The Brithdir Member consists of interbedded mudstone, siltstone and sandstone with frequent coal measures distributed throughout the sequence. The Brithdir Member is described as lithic arenite (fine grained, clast supported sandstone) and is interbedded with thin mudstones and siltstones. The member is confined by coal seams at both the upper and lower boundary (BGS Lexicon). A coal seam, identified approximately

200m north of the site, overlays the Brithdir Member. It is known as the Hughes Coal and forms the base of the Hughes Member, a younger member of the Pennant Formation.

Also of note are the nearby faults that occur frequently in the Pennant Formation. Approximately 2km west of the site is a north/south fault. This fault appears to splay off a larger series of northwest/southeast orientated faults, where the main fault is approximately 1.6km north of the site, downthrown to the north. It is possible these faults may impact the permeability of the Brithdir Member.

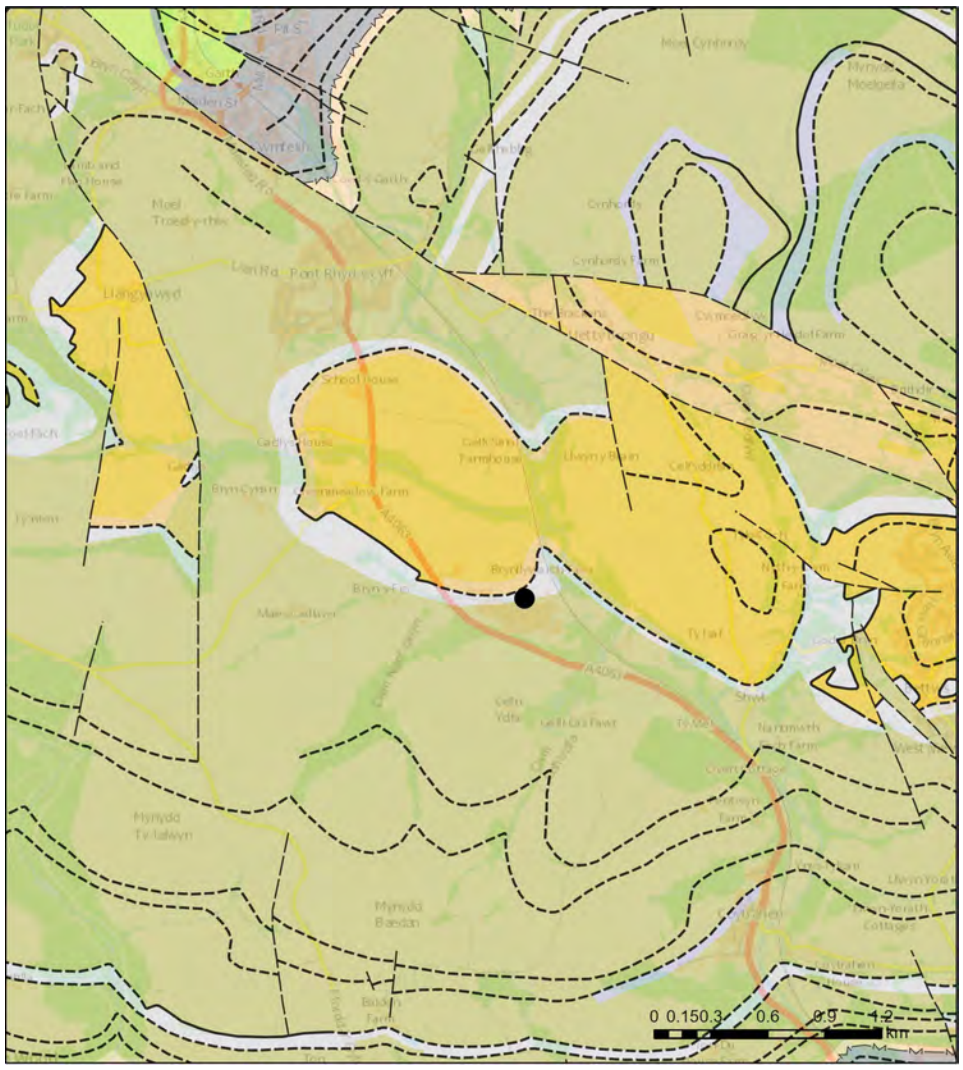

Figure 4) Bedrock and Linear Feature Geological Map, 1:50,000 scale (from BGS)

Step 2.2 - Groundwater

Both the Alluvium and Brithdir Member are water bearing:

- The alluvium is understood to have a water level resting at approximately 72.9 mOD (2.4 mbgl) and forms an unconfined Secondary (undifferentiated) aquifer.

- Based off a previous site investigation, the Brithdir Member is understood to form part of a confined aquifer under artesian conditions. Previous investigations and data gathered during dewatering of the Department C indicate piezometric levels up to approximately 79.0 mOD (4.85m above the proposed piling platform). Therefore, due to these conditions, there is a risk of encountering upward flow when the piling works are carried out.

The site is not located within 1000m of any source protection zones (SPZ). The closest SPZ is approximately 8.6km south east of the site (east of Bridgend), as shown in Figure 5.

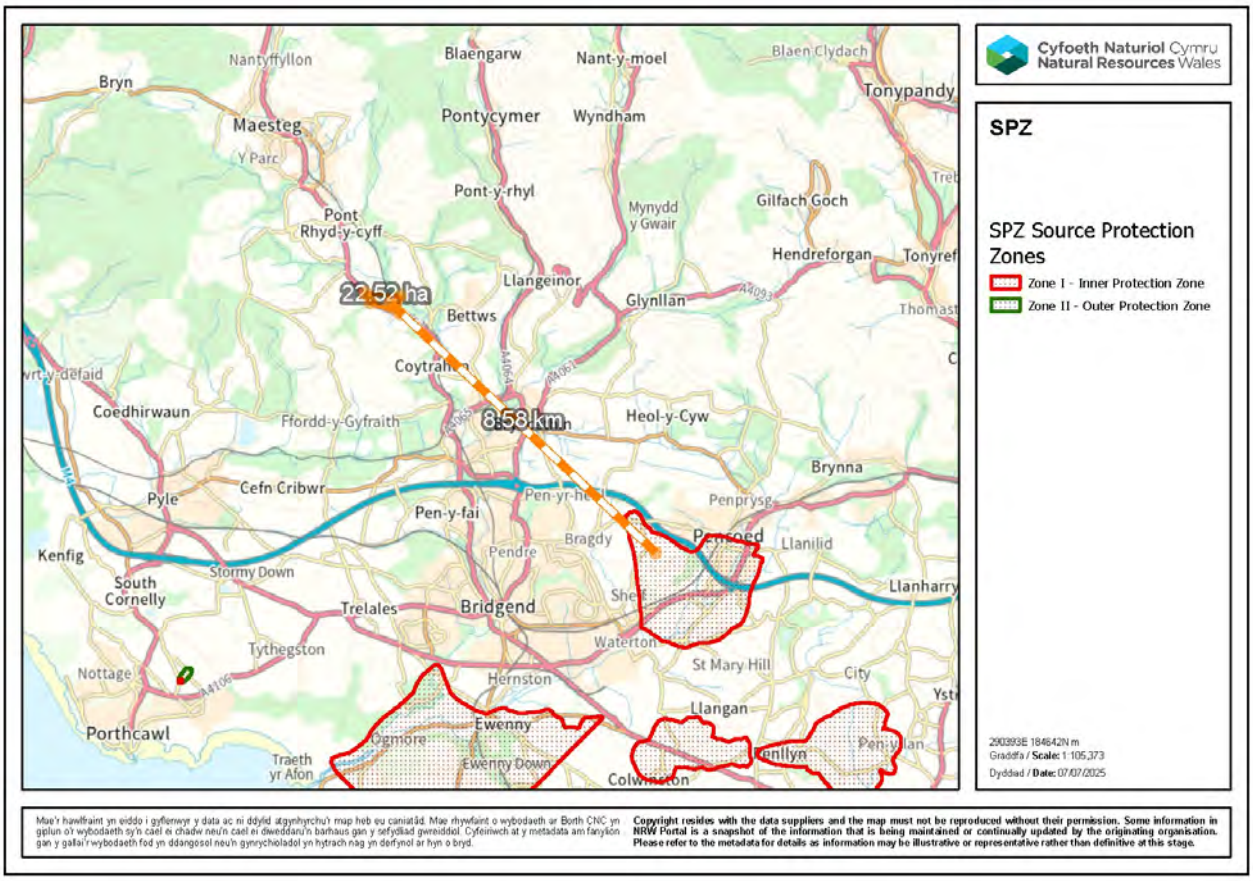

Figure 5) Source Protection Zone plan

Step 2.3 – Proposed Construction

The main contract works involves the construction of a new paper machine hall. The plan area of the excavation is approximately 99.0 x 48.5 m and is required for the construction of building foundations. The ground level at this site is approximately 75.5 mOD. The excavation will reduce this level to 74.1 mOD (1.4

mbgl) for the piling platform. Bearing piles will be installed from this platform to an average depth of 56.1 mOD and the deepest to 53.1 mOD.

Further excavations will be carried out between 73.5 mOD and 72.3 mOD for the pile cap installation. Excavation side support for the pile caps will be provided by battered slopes.

Step 2.4 – Proposed Construction Dewatering

Superficial Deposits

Groundwater inflows from the superficial deposits will require control during excavation of the deepest pile caps.

Due to the groundwater level and variable nature of the deposits with interlayered clays, sands and gravels, inflow is to be managed via conventional sump pumping techniques. Sump pumping operations will require a system of drains installed around the perimeter to collect groundwater inflows as it enters the excavation. The drains should be connected to feed into one or more sumps, usually located at the deepest point of the excavation. Groundwater from the sump pumping system will be pumped through the lamella plate tanks prior to discharge.

South Wales Coal Measures

Groundwater levels within the Coal Measures have been recorded at approximately 79.0 mOD, less than 100 metres south of the proposed excavation and piling works. A pumping test was previously undertaken, and a dewatering system was installed and operated to facilitate the construction of Department C on site.

In October 2020, WJ undertook a pumping test on site in a well screened within the Coal Measures, approximately 100m south of the current works. The pumped well was tested for 3 days at a flowrate of approximately 3 l/s. An array of piezometers screened in the Superficial Deposits and in the Brithdir Member were monitored during the test to provide drawdown data at various distances from the pumped well. The steady state distance drawdown plot for the test is given in Figure 6, below:

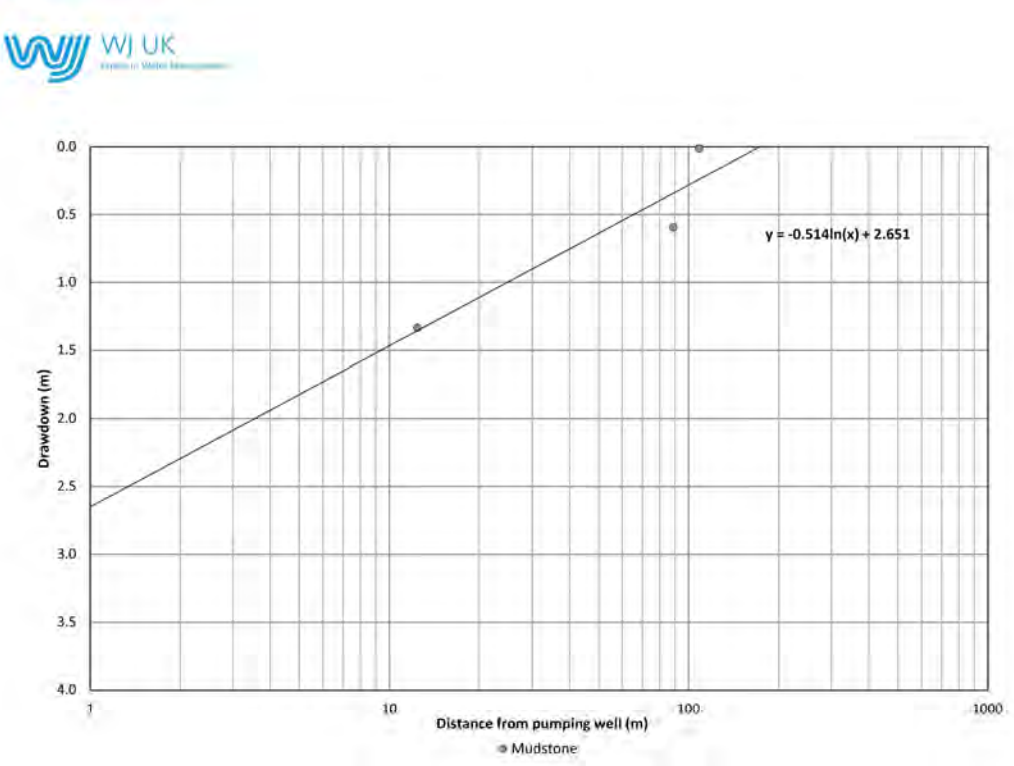

Figure 6) PT1 Distance Drawdown plot, WJ 2020

The graph shows the response in the Mudstone, with indicates that drawdown between 1.4 m some 12 m from the pumped well to 0.6 m 90 m from the pumped well. The graph indicates the distance of influence of approximately 180 m.

Following test, a dewatering system was installed and operated to aid construction of Department C. The system consisted of a ring of pumped wells equipped with submersible pumps to lower the groundwater level in the Brithdir Member and mitigate the risk of base heave during excavation. The system achieved approximately 7 m of drawdown, with an average pumping rate of approximately 10 l/s, as shown in Figure 7.

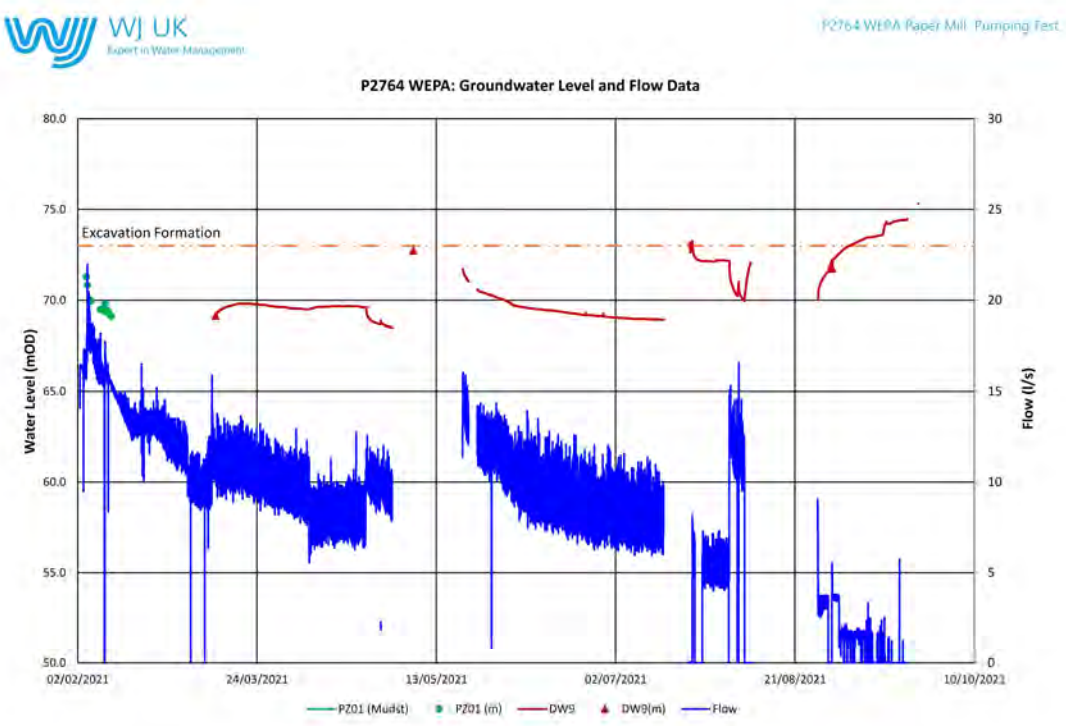

Figure 7) Dewatering Flows and Groundwater Levels Department C - WJ 2021

In order to lower groundwater pressures from standing groundwater level at 79.0 mOD to the platform level, at 74.15 mOD, 4.85 m of drawdown is required.

The groundwater abstraction flows required to lower groundwater pressure around the proposed Vesta Building have been calculated using the data obtained from the pump test and dewatering operations at the Department C. Since both schemes a similar in size, a simple ratio of the perimeter length and required drawdown has been used to estimate the necessary flow rate:

Flow = (New perimeter/ Dep C perimeter x Abstraction flow rate) x (Drawdown required/ Drawdown achieved = (300/280 x 10) x (4.85/7) = 7.4 l/s

To accommodate potential variability in local geology, additional capacity is required. To provide contingency, a system of 10 no. abstraction wells is proposed, along with 2 no. monitoring/contingency wells. These contingency wells will be constructed to the same specification as the pumped wells and will be connected to the system if necessary.

Step 2.5 - Proposed dewatering system

In order to control groundwater levels within the Coal Measures, an array of pumped external wells would be installed to the following outline specification:

Well Detail	
No. of Deepwells	Total: 12 No. (10 No. pumped + 2 No. unpumped/ monitoring wells)
Well Location	Equally spaced around the external perimeter of the building footprint
Installation Level	Piling platform (74.1 mOD)
Depth	21.0 m depth (toe to maximum 53.1 mOD)
Bore Size	Ø250 mm nominal
Liner Size	Ø140 mm nominal
Pump size	1.5 kw pumps

The layout of the proposed system is shown in Appendix B (Vesta PM Building - Dewatering and Discharge Layout).

The pumps would be powered from a central control cabin with power cables generally following the line of the discharge pipework. The pumps would feed to a 150 mm main which would discharge at a (licensed) discharge location, via a v-notch tank. The v-notch tank allows monitoring of flows and visual assessment of water quality.

Step 3 – Water features susceptible to flow impacts.

There are 52 no. surface water features identified within the 1 km of the site. These include Nant Gwyn, a small stream that flows both on the surface and through culverts. It originates from a spring located southeast of the site and flows westward. Nant Cefnydfa, another small stream, flows northward from a spring located south of site. This stream also feeds into a lake and wetland, both located to the south of the site. River Llynfi (Afon Llynfi) is located approximately 200 m east to northeast of the boundary of the site. This river is designated under the Water Framework Directive.

15 No. historical and active surface water abstractions are recorded within 1km of the site, associated with the River Llynfi and Nant Gwyn.

There are no groundwater abstractions within 1 km of the site.

Step 4 – Likely flow impacts to the water features.

Groundwater control within the superficial deposits will be undertaken using localised sump pumping techniques, with drainage trenches connected to sumps on site. These activities will be limited to the site only. Inflow will be naturally occurring and not under any outside influence. Therefore this method is unlikely to influence the rivers near the site.

The active dewatering will target the underlying bedrock. The bedrock has a different groundwater level than the superficial deposits, with groundwater pressures above the ground level on site. This means that it is unlikely that the bedrock is well connected to the river network. Therefore any dewatering activities within the bedrock should not affect the surface water features in the vicinity of the site. There are no groundwater abstractions within 1 km of the site therefore flow impacts are considered minimal.

Step 5 – Mitigation of flow impacts

It is anticipated that abstracted groundwater will be discharged into the existing drainage network on site, which feeds into the site treatment plant. Water will then be discharged to the Ilynfi River, with no consumptive use. Although the groundwater is not being discharged back into the ground, it will be returned into the surface water system. Because of the temporary nature of the abstraction process the long-term, wider impact of the dewatering is anticipated to be minimal.

Step 6 – Significance of net flow impacts

The abstracted groundwater will be discharged into the Ilynfi River and therefore returned into groundwater/surface water system. Therefore, the net flow impacts are thought to be insignificant.

Step 7 – Search area for drawdown impacts

The primary water features that will be susceptible to the drawdown impacts will be those that fall within the zone of influence of the dewatering system.

Using the distance-drawdown graph generated from the single well pumping test completed in 2020 as shown in Figure 6 in section above, the distance of influence can be estimated as to be 180 m.

Step 8 – Water Features susceptible to drawdown impacts.

There are no groundwater abstractions within 1km of the site and the site is not located within the Source Protection Zones (SPZ) as shown in Figure 5 and there are no Site of Special Scientific Interest (SSSI) within 2 km of the site, as shown in Figure 8.

Step 9 – Predicted maximum drawdown impacts.

Approximately 4.85 m of drawdown is required for the construction of the new paper machine hall. These requirements are within the excavations only, and the drawdown outside the excavation will decrease with the distance. From the pumping test, the predicted distance of influence is c. 180 m, therefore any impact on groundwater levels in the bedrock should be limited to the site boundaries.

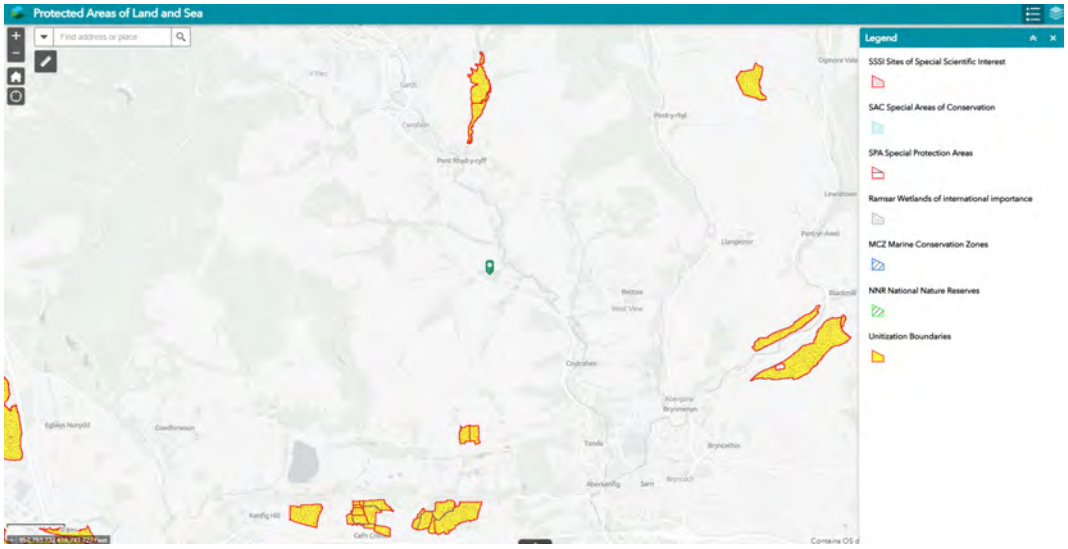

Figure 8) Land based areas of conservation

Step 10 – Mitigation of drawdown impacts

The impact of drawdown has not been formally mitigated against during the development of the dewatering proposals. The required drawdown is up to 5.0 m. There are no groundwater abstractions within 1 km of the site and drawdown impact will be limited to the site boundaries. Moreover, dewatering activities are temporary and therefore any impact is anticipated to be minimal.

Step 11 – Significance of drawdown impacts

Due to the temporary nature of the dewatering, the impacts of groundwater drawdown is anticipated to be minimal.

Step 12 – Water Quality

The site is occupied by a working Paper Mill and the site is located within a larger industrial area. Historically, a power plant and a landfill were located to the southeast of the site. There are currently eight licensed waste sites within 1km of the site, however all of them are located at least 180 m of the site.

A groundwater sample was taken on site from the bedrock and the results were reported as follows:

Parameter	Form	Unit	Result
Total nitrogen	N	mg/l	0.792
Nitrates	NO3-N	mg/l	0.089
Ammonia	NH3-N	mg/l	0.15
Total phosphorus	P	mg/l	0.065
Phosphates	PO4-P	mg/l	0.06

Parameter	Form	Unit	Result
COD	O2	mg/l	9.84
BOD	O2	mg/l	1.16
Chlorides	CL	mg/l	12
Suspended solids	-	mg/l	104

There is a slightly elevated suspended solids content, potentially associated with the cleaning out the well which is likely to improve once the actively pumped system is operational. Therefore, there was no indication of any significant contamination in this groundwater sample. It should be noted that as a contingency should contamination be detected in the abstracted groundwater, groundwater would be treated in the treatment plant through the proposed discharge line prior to discharge to the River Llynfi.

In addition to this, the issue of silt entrainment in the discharged water should be addressed. Dewatering will be undertaken via a deep well dewatering system (as outlined within Step 2.3) and then passed through a monitoring tank prior to discharge. The dewatering wells will be installed with a slotted liner and filter material appropriate to the geology it is installed in. This will reduce the risk of silt contamination during discharge as it will eliminate the removal of fines from the ground during pumping. Groundwater from the sump pumping operations within the superficial soils will be discharged through a lamella plate tank in order to remove any fines before the discharge.

Step 13 – Redesign mitigation measures

Not necessary.

Step 14 - Monitoring strategy

All groundwater monitoring would be undertaken in accordance with the terms of any abstraction or discharge permits issued for the works.

Two monitoring wells will be used to observe groundwater levels throughout the construction. While the dewatering wells from the previous developments south of the new development have been decommissioned, no other monitoring wells have been found during walkovers of the site and have likely been decommissioned.

Visual inspections of the v-notch tank would ensure that no problems were developing with regards to silt mobilisation, and visual or olfactory contaminants.

It is anticipated that groundwater levels would recover upon the cessation of pumping, once construction has been completed, and therefore no long-term groundwater monitoring should be required.

3. WATER FEATURES SURVEY

A walk over water features survey has been carried for the area within 1500m of the site, and is included within Appendix C.

4. REFERENCES

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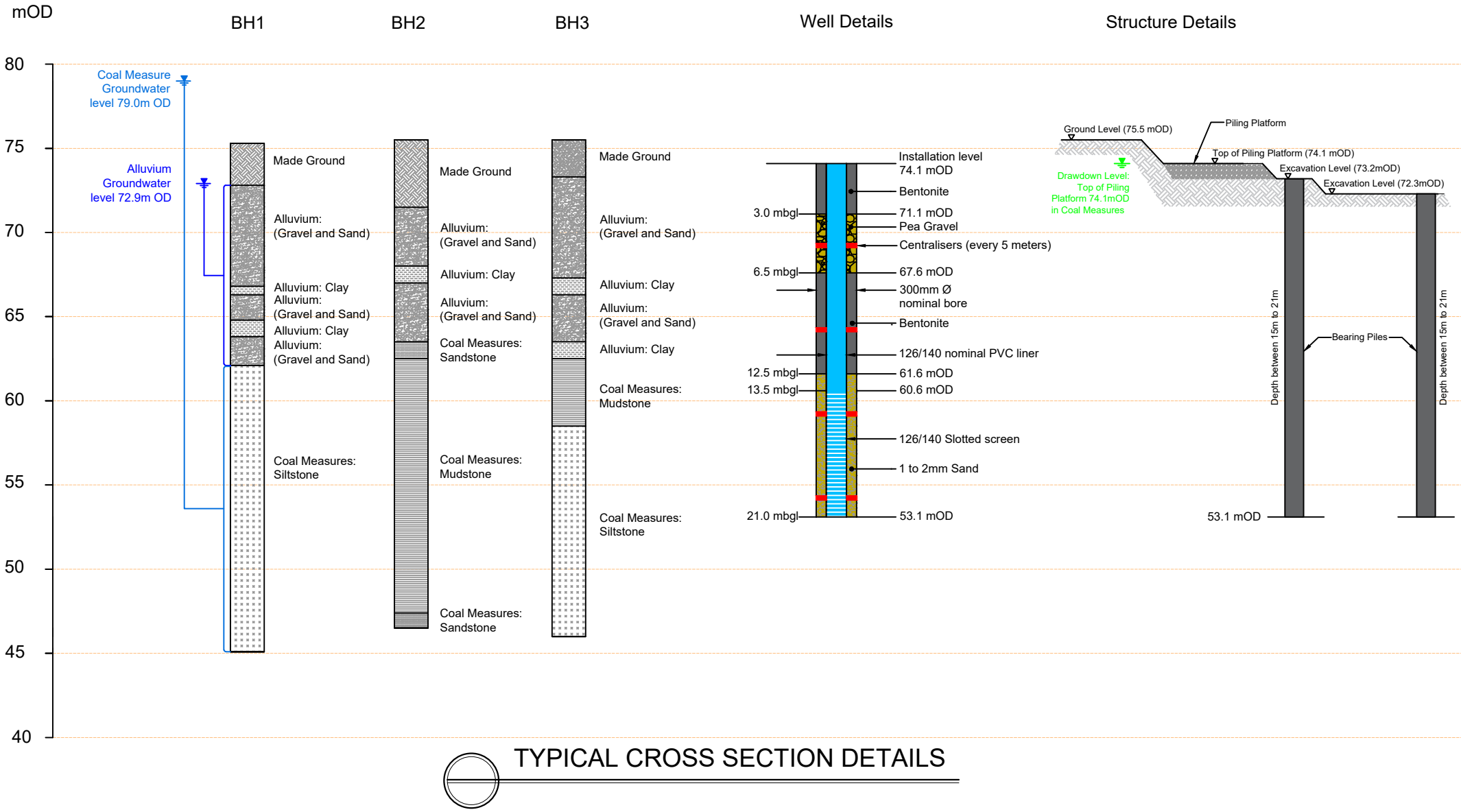
APPENDIX A: CROSS SECTION



TYPICAL CROSS SECTION DETAILS

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Notes:

1) Well installation and location details are for indicative purposes only.
2) Others to check that indicated locations are free from services and underground structures.

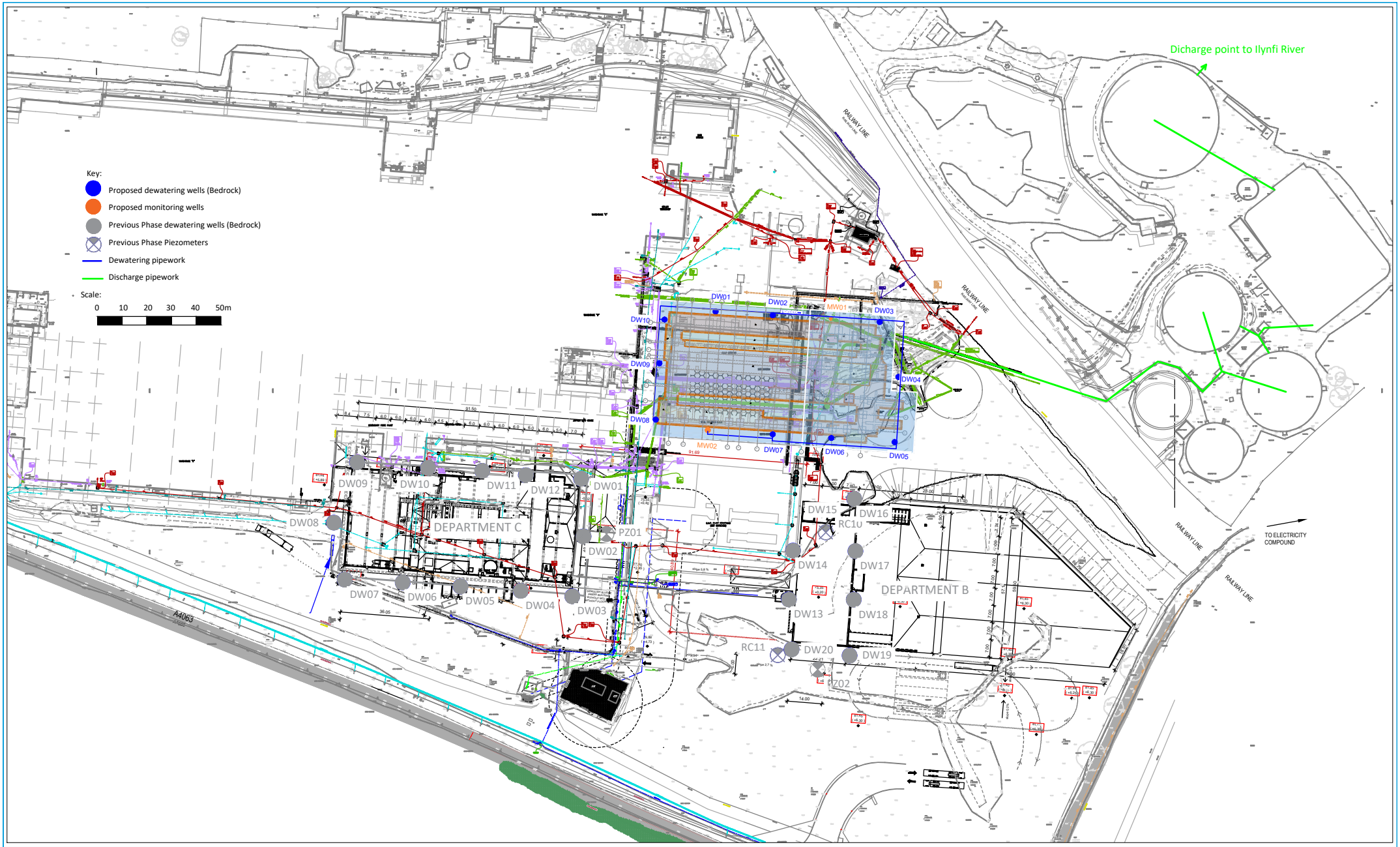
Rev No	Drawn	Checked	Approved	Date	Reason for revision
00	BR	AC	UM	21/06/2025	Issue for review

Project Name:
Vesta PM Building,
Bridgend, Maesteg, CF34 9RS

Drawing Title:
Typical Cross Section Details

Drawing No: P3672/003 | Scale:NTS

APPENDIX B: P3680-004-REV00-VESTA PM BUILDING - DEWATERING AND DISCHARGE LAYOUT



Notes:

1) Well installation and location details are for indicative purposes only.
2) Others to check that indicated locations are free from services and underground structures.

Rev No	Drawn by	Check by	Date	Reason for revision
00	CD	TCW	08/07/2025	Issue for review

Project Name:
WEPA Paper Mill, Bridgend

Drawing Title:
Proposed Dewatering&Discharge Layout

Drawing No: P3680/004

Scale:As Shown

APPENDIX C: WATER FEATURES SURVEY

Water Features Survey

Date(s) of survey: 21/09/2020 to 22/09/2020

Completed by: Harry Lee

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 1	National Grid Reference (12 digit): *SS 87414 86940* Distance from source (metres): *1000* Licence serial number: Unknown	*Spring*	*Altered Spring/Stream*	*No*	*Unable to establish*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Site reference 2	National Grid Reference (12 digit): *SS 87038 86734* Distance from source (metres): *500* Licence serial number: *Unknown*	*Bog*	*Nature Bog*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Site reference 3	National Grid Reference (12 digit): *SS 86931 86460* Distance from source (metres): 400 Licence serial number: *Unknown*	*Stream into bog*	*Nature Stream*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 4	National Grid Reference (12 digit): *SS 86628 86208*	*Spring*	*Nature Spring*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
	Distance from source (metres): *0*								
	Licence serial number: Unknown								
Site reference 5	National Grid Reference (12 digit): *SS 87232 86248*	*Spring & Stream*	*Nature Spring & Stream*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
	Distance from source (metres): *0*								
	Licence serial number: *Unknown*								
Site reference 6	National Grid Reference (12 digit): *SS 87707 85969*	*Spring & Stream*	*Nature Spring & Stream*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
	Distance from source (metres): 0								
	Licence serial number: *Unknwon*								

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 7	National Grid Reference (12 digit): SS 87991 86680 Distance from source (metres): *0* Licence serial number: Unknown	*Man Made Pond*	*Unknown*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Site reference 8	National Grid Reference (12 digit): *SS 88106 86738* Distance from source (metres): *0* Licence serial number: *Unknown*	*Stream emerging from under trackway*	*Nature Stream*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Site reference 9	National Grid Reference (12 digit): *SS 88178 86851* Distance from source (metres): 150 Licence serial number:	*Stream going below road*	*Nature Stream*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 10	National Grid Reference (12 digit): SS 88223 86936 Distance from source (metres): Unknown Licence serial number: Unknown	*Pond*	*Unknown*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Site reference 11	National Grid Reference (12 digit): *SS 87530 87036* Distance from source (metres): *1200* Licence serial number: *unknown*	*Stream running into tunnel below A4063*	*Nature Stream*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Site reference 12	National Grid Reference (12 digit): *SS 87218 87324* Distance from source (metres): 200 Licence serial number: *Unknown*	*Stream running under track*	*Nature Stream*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 13	National Grid Reference (12 digit): SS 87105 87231 Distance from source (metres): *750* Licence serial number: Unknown	*Stream*	*Nature Stream*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Site reference 14	National Grid Reference (12 digit): SS 86822 87171 Distance from source (metres): 340 Licence serial number: *Unknown*	*Stream*	*Nature Stream*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Site reference 15	National Grid Reference (12 digit): SS 86483 87049 Distance from source (metres): 100 m Licence serial number: *Unkown*	*Stream*	*Nature Stream*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 16	National Grid Reference (12 digit): SS 86329 88030 Distance from source (metres): *unknown* Licence serial number:unknown	*River*	*Nature River*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Site reference 17	National Grid Reference (12 digit): SS 86598 88089 Distance from source (metres): unknown Licence serial number: *unknown*	*Stream*	*Small stream diverted through duct under road*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Site reference 18	National Grid Reference (12 digit): SS 86702 87999 Distance from source (metres): Unknown Licence serial number: Unknown	*River*	*Nature River*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 19	National Grid Reference (12 digit): SS 86827 88109 Distance from source (metres): unknown Licence serial number: Unknown	*Drainage*	*Drainage under B Road*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Site reference 20	National Grid Reference (12 digit): Distance from source (metres): *unknown* Licence serial number: *Unknown*	*River*	*Nature River*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Site reference 21	National Grid Reference (12 digit): SS 88008 86989 Distance from source (metres): N/A Licence serial number: *Unknown*	*Borehole (RC11)*	*Monitoring*	*No*	*50 mm*	*14.56 mbgl*	*3.52 mbgl*	*N/A*	*WEPA*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 22	National Grid Reference (12 digit): SS 87880 87020 Distance from source (metres): N/A Licence serial number: Unknown	*Borehole (RC06)*	*Monitoring*	*No*	Unknown	Unknown	Unknown	*N/A*	*WEPA*
Site reference 23	National Grid Reference (12 digit): SS 87831 87040 Distance from source (metres): N/A Licence serial number: Unknown	*Borehole (RC06)*	*Monitoring*	*No*	*50 mm*	*14.83 m*	*1.67 m at 14:43*	*N/A*	*WEPA*
Site reference 24	National Grid Reference (12 digit): SS 87919 87021 Distance from source (metres): N/A Licence serial number: Unknown	*Borehole (RC08)*	*Monitoring*	*No*	*50 mm*	*14.84*	*2.17 mbgl at 14:52*	*N/A*	*WEPA*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 25	National Grid Reference (12 digit): SS 87893 86998 Distance from source (metres): N/A Licence serial number: Unknown	*Borehole (RC9)*	*Monitoring*	*No*	Unknown	Unknown	Unknown	*N/A*	*WEPA*
Site reference 26	National Grid Reference (12 digit): SS 88016 87125 Distance from source (metres): N/A Licence serial number: Unknown	*Borehole (unknown ID)*	*Monitoring*	*No*	*50 mm*	*4.2 mbgl*	*2.23 mbgl at 15:00*	*N/A*	*WEPA*
Site reference 27	National Grid Reference (12 digit): SS 88019 87125 Distance from source (metres): N/A Licence serial number: Unknown	*Discharge Point B*	*Discharge Point*	*No*	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*WEPA*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 28	National Grid Reference (12 digit): SS 88027 87110 Distance from source (metres): N/A Licence serial number: Unknown	*Borehole 3*	*Monitoring*	*No*	*50 mm*	*14.7 mbgl*	*1.95 mbgl at 15:07*	*N/A*	*WEPA*
Site reference 29	National Grid Reference (12 digit): SS 88020 87093 Distance from source (metres): *Unknown* Licence serial number: *Unknown*	*Stream / Discharge Point*	*Diverted Stream*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*WEPA*
Site reference 30	National Grid Reference (12 digit): SS 88039 87158 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Unknown water processor*	*Unknown*	*Unknown*	*N/A*	*N/A*	*N/A*	*N/A*	*WEPA*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 31	National Grid Reference (12 digit): SS 87984 87122 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Borehole (RC13)*	*Monitoring*	*No*	*50 mm*	*14.9 mbgl*	*1.19 mbgl at 15:36*	*N/A*	*WEPA*
Site reference 32	National Grid Reference (12 digit): SS 87975 87134 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Borehole (RC12)*	*Monitoring*	*No*	*50 mm*	*14.41 mbgl*	*1.04 mbgl at 15:38*	*N/A*	*WEPA*
Site reference 33	National Grid Reference (12 digit): SS 88025 87040 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Borehole (RC10)*	*Monitoring*	*No*	*50 mm*	*24.38 mbgl*	*0.91 mbgl*	*N/A*	*WEPA*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 34	National Grid Reference (12 digit): SS 88049 87288 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Abstraction Building*	*Abstraction*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*WEPA*
Site reference 35	National Grid Reference (12 digit): SS 88090 87239 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Borehole 4*	*Monitoring*	*No*	*50 mm*	*7.31 mbgl*	*3.93 mbg at 16:00*	*N/a*	*WEPA*
Site reference 36	National Grid Reference (12 digit): SS 88172 87189 Distance from source (metres): Licence serial number:	*Abstraction Point A and Discharge Point F*	*Abstraction & Discharge Points*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*WEPA*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 37	National Grid Reference (12 digit): SS 88171 87159 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Stream going into tunnel*	*Natural Stream*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*WEPA*
Site reference 38	National Grid Reference (12 digit): SS 88202 87209 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Stream discharging into River*	*Stream discharge*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*WEPA*
Site reference 39	National Grid Reference (12 digit): SS 87629 87102 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Borehole 5*	*Monitoring*	*No*	*20 mm*	*4.40 mbgl*	*1.05 mbgl at 08:18*	*N/A*	*WEPA*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 40	National Grid Reference (12 digit): SS 87602 87143 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Abstraction Point 1*	*Abstraction Point*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*WEPA*
Site reference 41	National Grid Reference (12 digit): SS 87581 87120 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Borehole 1*	*Monitoring*	*No*	*50 mm*	*4.40 mbgl*	*1.32 mbgl a 08:31t*	*N/A*	*WEPA*
Site reference 42	National Grid Reference (12 digit): SS 87550 87146 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Borehole (unnamed)*	*Monitroing*	*NO*	*20 mm*	*4.1 mbgl*	*0.0 mbgl at 08:33*	*N/A*	*WEPA*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 43	National Grid Reference (12 digit): SS 87978 87429 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Stream*	*Nature Stream*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*Unknown*
Site reference 44	National Grid Reference (12 digit): SS 88008 87418 Distance from source (metres): Unknown Licence serial number: *Unknown*	*River*	*Nature River*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*Unknown*
Site reference 45	National Grid Reference (12 digit): SS 88116 87553 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Dyke*	*Draining*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*Unknown*

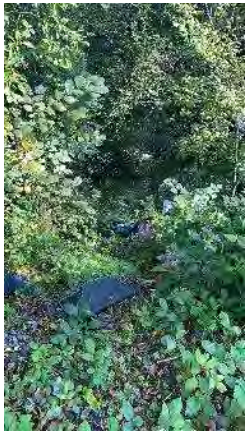
Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 46	National Grid Reference (12 digit): SS 88234 87359 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Stream*	*Natural Stream*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*Unknown*
Site reference 47	National Grid Reference (12 digit): SS 88965 86482 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Pipe coming out of river wall*	*Pipe in river bank*	*No*	*Approx 0.3 m diameter*	*N/A*	*N/A*	*N/A*	*Unknown*
Site reference 48	National Grid Reference (12 digit): SS 88912 86593 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Water Works*	*Unknown Status*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*Unknown*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 49	National Grid Reference (12 digit): SS 89163 86609 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Stream*	*Nature Stream*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*Unknown*
Site reference 50	National Grid Reference (12 digit): SS 89180 86437 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Tributary (Stream joining River)*	*Nature Stream /River*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*Unknown*
Site reference 51	National Grid Reference (12 digit): SS 89241 86352 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Man-made lake*	*Unknown. Presume agricultural*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*Unknown*

Survey sheet number ___ of ___		Water feature (borehole, well, pond, spring, adit, seepage, wetland, lake, watercourse, or other)	Use (e.g. agricultural, drinking water, disused)	Alternative supplies available (e.g. mains water)	Diameter (millimetres)	Depth to bottom (metres)	Depth to rest water level (metres)	Depth to pumped water level (metres)	Name, address and telephone number of occupier and owner
Site reference 52	National Grid Reference (12 digit): SS 87795 88309 Distance from source (metres): Unknown Licence serial number: *Unknown*	*Water Treatment Works*	*Water Treatment*	*No*	*N/A*	*N/A*	*N/A*	*N/A*	*Unknown*

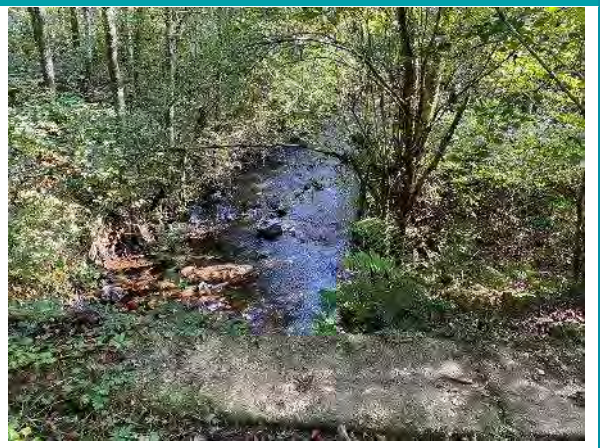
Site reference 1	Site reference 2	Site reference 3
		
Pipe emerging from ground causing waterfall of water into stream below. Direction of flowing water towards East. Photo taken looking north. Expected that it is linked to Cwn Nant Gwyn.	Boggy area on flat ground. Water saturated ground.	Stream running into boggy area. Very low flow.
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 4	Site reference 5	Site reference 6
 Start of stream emerging from boggy ground located at the top of woods in valley.	  Map indicates stream in valley below. Valley bottom is treed and fenced making access not possible. No access to be able to see water feature.	  View down to valley containing Nant Cefnydfa but not access to water feature.
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

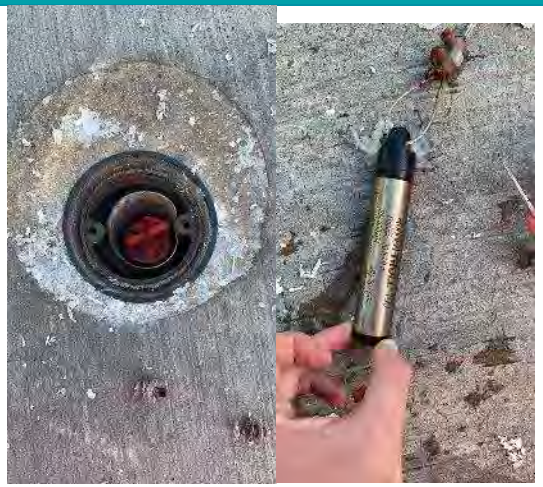
Site reference 7	Site reference 8	Site reference 9
  Dense woodland where 3no. man made ponds are indicated on OS Maps. No access into woods so cannot confirm water feature	 Fast flowing stream approximately 50 m below drop. Unable to see source point but must be coming from below track way.  Stream is found on the left side of the phot below a drop.	 Unable to reach river side due to dense vegetation. Exact point where stream goes under the road (A4063) is unclear. Stream is fats flowing and approx. 2 m wide.
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 10	Site reference 11	Site reference 12
  Ponds indicated on multiple maps. Ponds are not visible from road and unable to enter area due to fences and dense vegetation.	  River approx. 2 m wide and fast flowing runs into brick built tunnel. Photos taken from track above tunnel. River flowing towards the East.	 Stream flowing through 300 mm duct under track. Stream diameter approx. 1 m and moderate flow.
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 13	Site reference 14	Site reference 15
 Wide shallow stream that crosses over trackway. Low flow. Flowing eastwards	 Low flow river in river bed that appears to accommodate greater volume of water. Flow towards East	 River at furthest west point that has access. River diameter approx 0.3 m – more narrow than downstream but flow appears to be faster
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 16	Site reference 17	Site reference 18
 Photo looking up stream Nat y Gaeltach. River runs through 3no. Ducts whilst passing under farm track. River diameter approx. 6 m. Moderate Flow	 Small stream (width – 0.2 m) with very little water running underneath B road near to Gadlys Farm.	 Foot bridge over Nat y Gaeltach
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

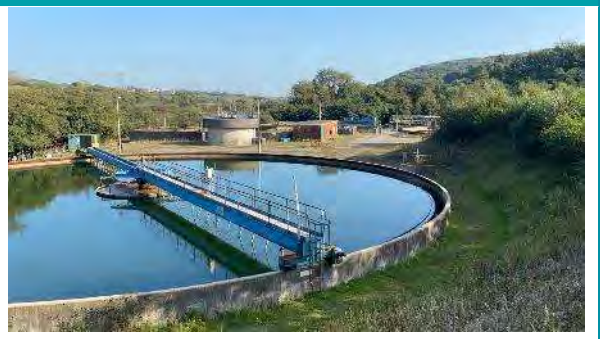
Site reference 19	Site reference 20	Site reference 21
 Man made water drainage underneath B road. Very little water	  A4063 bridge running over Nat y Gaeltach	  BH RC11. Upstand 0.39 m, two divers installed.
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 22	Site reference 23	Site reference 24
 Location found but cover is damaged and could not be opened.	 RC6 – 50 mm diameter, depth of BH = 14.83 mbgl m, water level 1.67 mbgl at 14:43. 1no. diver installed.	 RC8 – 50 mm diameter, depth = 14.84 m, dip at 14:52 =2.17 mbgl. No diver or bung in borehole.
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 25	Site reference 26	Site reference 27
 Borehole RC9 could not be found and presumed to be beneath piles of paper waste shown in image abobe.	  Borehole not on maps and has no idea. Contained gas release bung and plastic tube within. Diameter 50 mm, Depth =4.2 mbgl and water level 2.23 mbgl at 15:00.	  Discharge Point B.
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

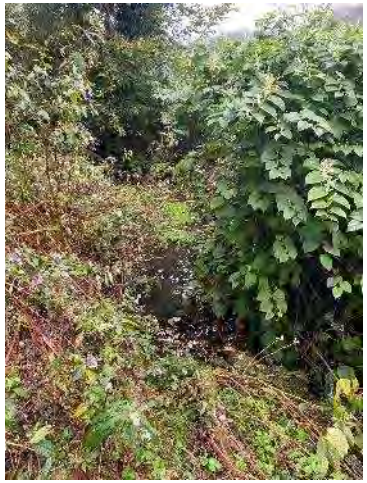
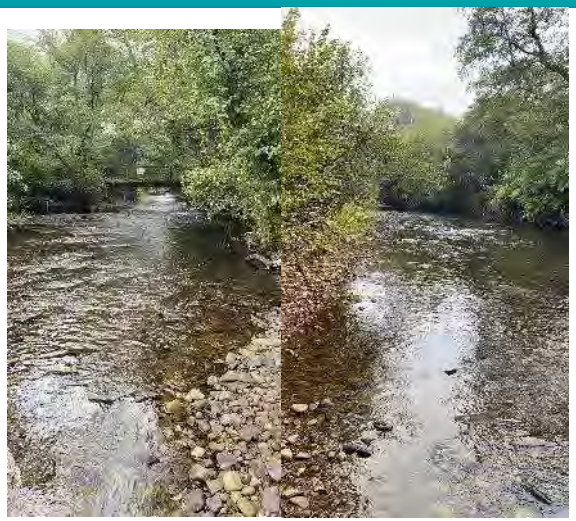
Site reference 28	Site reference 29	Site reference 30
  Borehole with sign close by ‘Borehole 3). Depth of well – 4.70 mbgl Depth of water -1.95 mbgl at 15:07 Upstand – 0.25 m	 Water flowing from pipe coming from WEPA factory and flowing east towards main river	 Unknown water processor.
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 31	Site reference 32	Site reference 33
  RC13 Upstand – 0.41 m Well Depth -14.9 mbgl Water depth – 1.19 mbgl at 15:36	  RC12 Upstand – 0.29 m Well depth -14.41 mbgl Water depth – 1.04 mbgl at 15:38	   RC10 Upstand – 0.29 m Well depth – 24.38 mbgl Water depth – 0.91 mbgl at 15:45
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 34	Site reference 35	Site reference 36
   Abstraction Point A – not signed but presume building is abstracting water.	 Borehole 4 Upstand – 0.29 m Well depth – 7.31 mbgl Water depth – 3.93 mbgl at 16:00	 Abstraction Point A and Discharge point F somewhere within sewage treatment works but exact locations could not be identified.
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 37	Site reference 38	Site reference 39
 Stream (identified in Site Reference 29) going into tunnel underneath the sewage works).	 Tunnel with water discharging through -lines up with site reference 37. Water flowing into river that is approximately 8 m wide and has a moderate flow.	 Borehole 5 Diameter 0.02 m Depth of borehole = 4.4 mbgl Depth of water = 1.05 m at 08:18
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 40	Site reference 41	Site reference 42
  Location of Abstraction point no. 1 No obvious signs signalling Abstraction but photos are from location.	 Borehole 1 Depth – 4.40 mbgl Water depth – 1.32 mbgl at 08:31 Diameter – 50 mm Excess soil inside borehole cover	 Borehole had no ID Contaminates surrounding BH reported to Mike Hughes (WEPA). BH Depth – 4.1 mbgl Water level – 0.0 mbgl at 08:33
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 43	Site reference 44	Site reference 45
 Low velocity stream approx. 2 m width.	 Fast flowing river approx 50 cm deep in middle and 8 m wide	 Dyke along edge of field. Very little water and no flow. Width approx. 1 m .
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 46	Site reference 47	Site reference 48
 Stream running under temporary road surace. Low velocity and draining towards main river.	  River going under bridge. 10 m upstream from brige is a pipe coming out of the western river wall that appears to be a water discahrge pipe. f	 Fence is distance makes a cluster of buildings. Location same as workworks that is marked on OS map. Unable to get any closer to buildings on public footpath Does not appear to be a working site.
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 49	Site reference 50	Site reference 51
 Stream approximately 3 m wide with fast velocity. Flowing south towards big river.	 Stream tributary into main river. Same stream as crossed in Site Reference 49	  Large agricultural pond fed by a man-made trench. Pond and trench appear to be hand dug
Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused	Access: Open / Sealed / Permission Refused

Site reference 52

Entrance to water treatment plant. Entrance is over a bridge crossing the main river. Unable to get into site or around the perimeter.

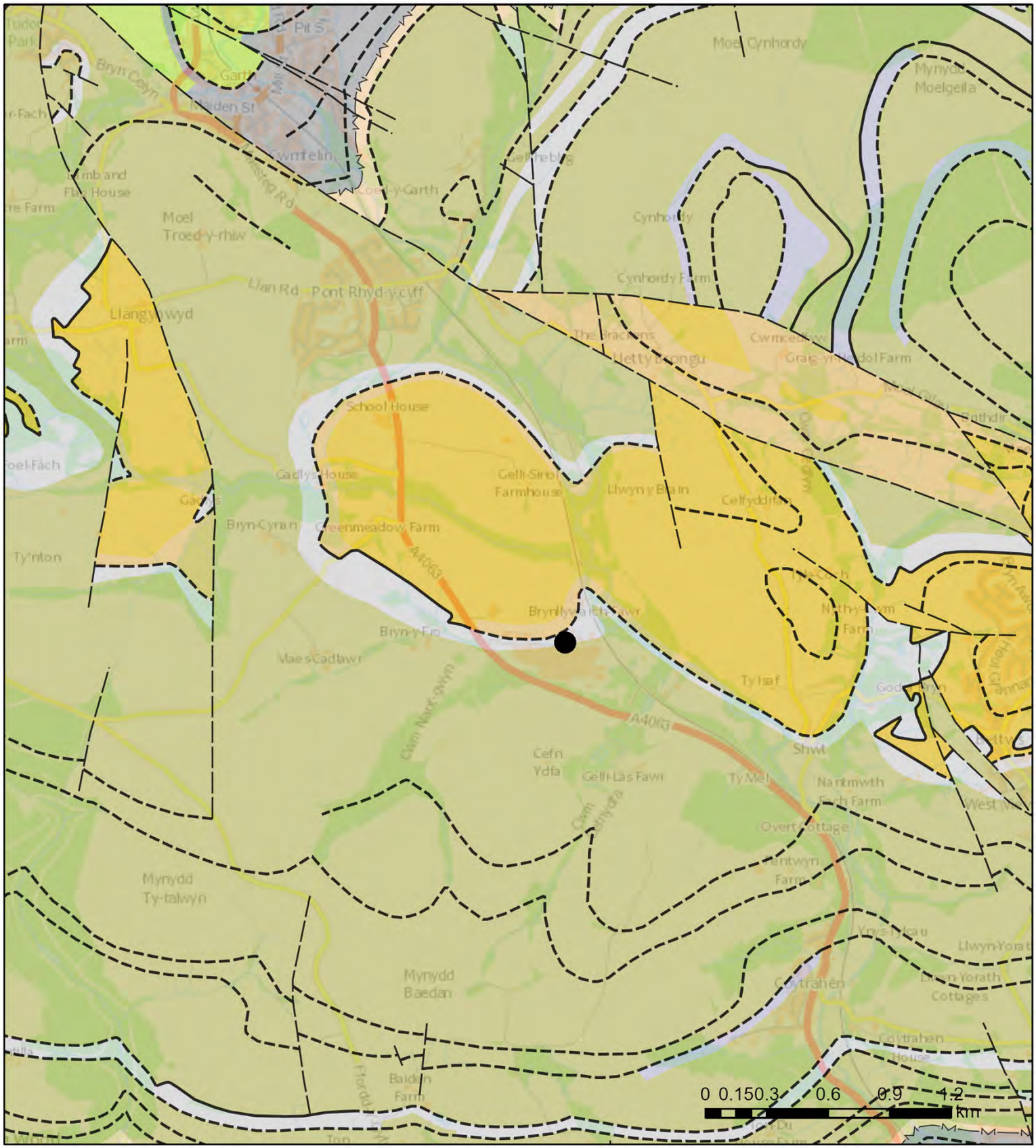
Access: Open / Sealed / Permission Refused

Appendix C: WJ 2020 Water Feature Survey

Layout of Water Features surveyed in 2020 by WJ.

APPENDIX D: GEOLOGICAL MAPS

Bedrock Report



Map Key

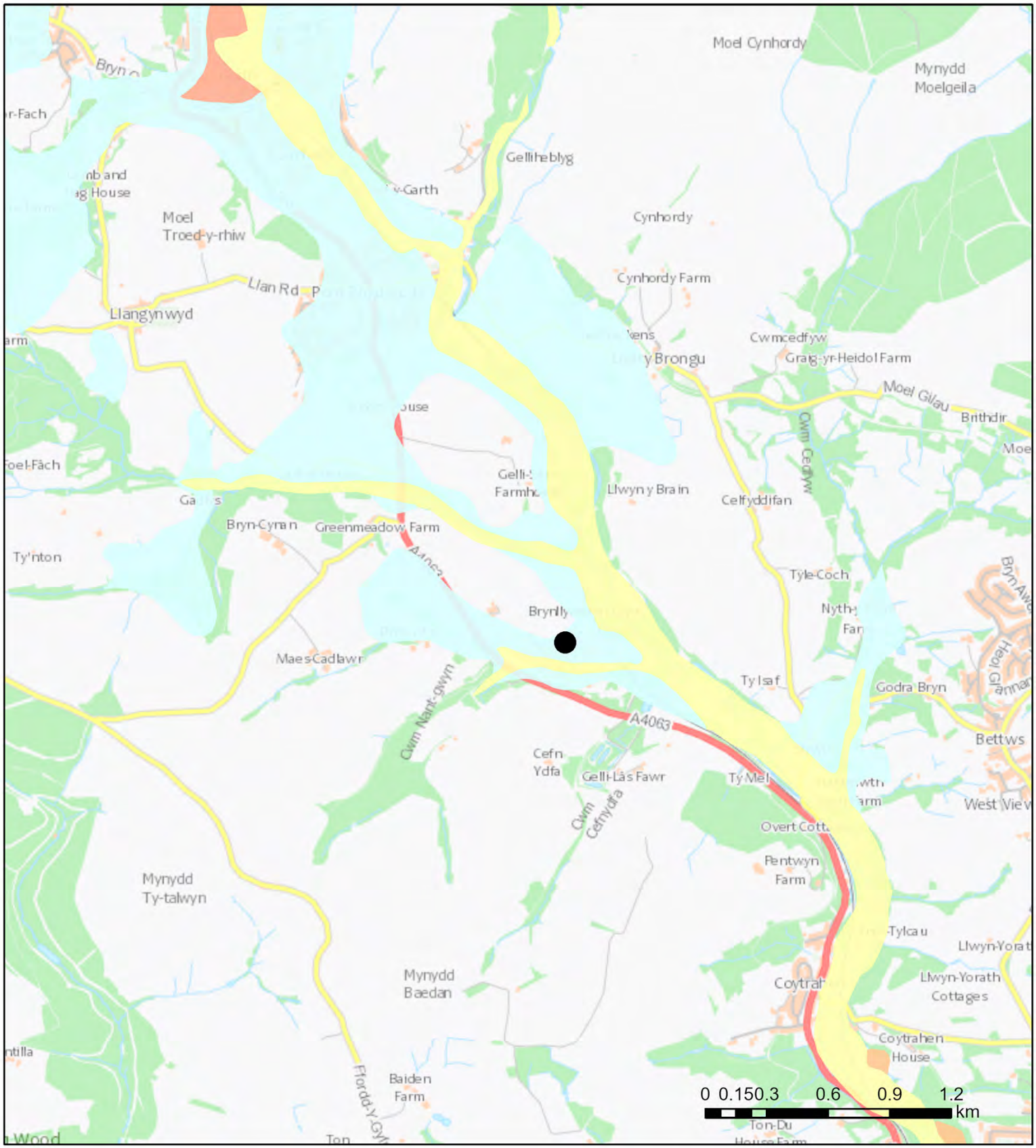
Bedrock geology 1:50,000 scale

- BRITHDIR MEMBER - MUDSTONE, SILTSTONE AND SANDSTONE
- LLYNFI MEMBER - MUDSTONE, SILTSTONE AND SANDSTONE
- RHONDDA MEMBER - MUDSTONE, SILTSTONE AND SANDSTONE
- SOUTH WALES UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- SOUTH WALES MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- HUGHES MEMBER - MUDSTONE, SILTSTONE AND SANDSTONE
- BRITHDIR MEMBER - SANDSTONE
- LLYNFI MEMBER - SANDSTONE
- RHONDDA MEMBER - SANDSTONE
- SOUTH WALES MIDDLE COAL MEASURES FORMATION - SANDSTONE
- HUGHES MEMBER - SANDSTONE

Linear features 1:50,000 scale

- Coal_seam_Inf
- Coal_seam_Obs
- Fault_Inf_Downthrow_unspecified
- Fault_Obs_Downthrow_unspecified
- Fault_Thrust_Inf_Triangle_on_hangingwall_side
- Marine_band

Superficial Report



Map Key

Superficial deposits 1:50,000 scale

- GLACIOFLUVIAL DEPOSITS, DEVENSIAN - SAND AND GRAVEL
- TILL, DEVENSIAN - DIAMICTON
- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- RIVER TERRACE DEPOSITS, 1 - SAND AND GRAVEL
- ALLUVIAL FAN DEPOSITS - SAND AND GRAVEL
- PEAT - PEAT