



DŴR CYMRU WELSH WATER

EVENT DURATION MONITORING

November 2023

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**EDM TEN Initial Investigation Report –
BW3206201
Penybont SWK**

Asset ID No. 50743

DOCUMENT CONTROL

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1	Initial draft	2/11/2023	A.Moule	
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Abbreviations

EDM.....	Event and Duration Monitoring
TBN.....	Trigger Breached Notification
CSO.....	Combined Sewer Overflow
SPS.....	Sewage Pumping Station
WwTW.....	Wastewater Treatment Works
DWF.....	Dry Weather Flow
PFF.....	Pass Forward Flow
STMF.....	Storm Tank Flow
STMRF.....	Storm Tank Return Flow
FFT.....	Flow to Full Treatment
SAS.....	Surplus Activated Sludge
SDP.....	Sustainable Drainage Plan
DWMP.....	Drainage and Wastewater Management Plan

1.0 Executive Summary

Penybont SWK is permitted to discharge storm sewage under Permit BP0212801 to Ogmere Estuary.

The asset breached its EDM requirements on 05/08/2023 when it spilt for the sixth time during the bathing season as per the Spill Block Counting Method.

Desktop studies and operational investigations have been undertaken, however the definitive root cause for spill frequency cannot be established at this time, but initial indications suggest hydraulic overload at the asset. This was due to high volumes of network flows being received and exceeding the assets' operational capacity.

Once monitors are installed, there will need to be a period of data collection to allow for further detailed root cause to be undertaken.

Welsh Water aim to complete the initial stage of installing monitors by 1st April 2024.

2.0 Site Information

2.1 Site Location

Penybont (Merthyr Mawr) WwTW is located 4 miles Southwest of Bridgend and serves the town of Bridgend and Porthcawl and the surrounding area. The population served by the WwTW is approximately 170,000.

The storm overflow is situated at the inlet of the WwTW which discharges via a 1675mm diameter outfall pipe to Ogmore Estuary.

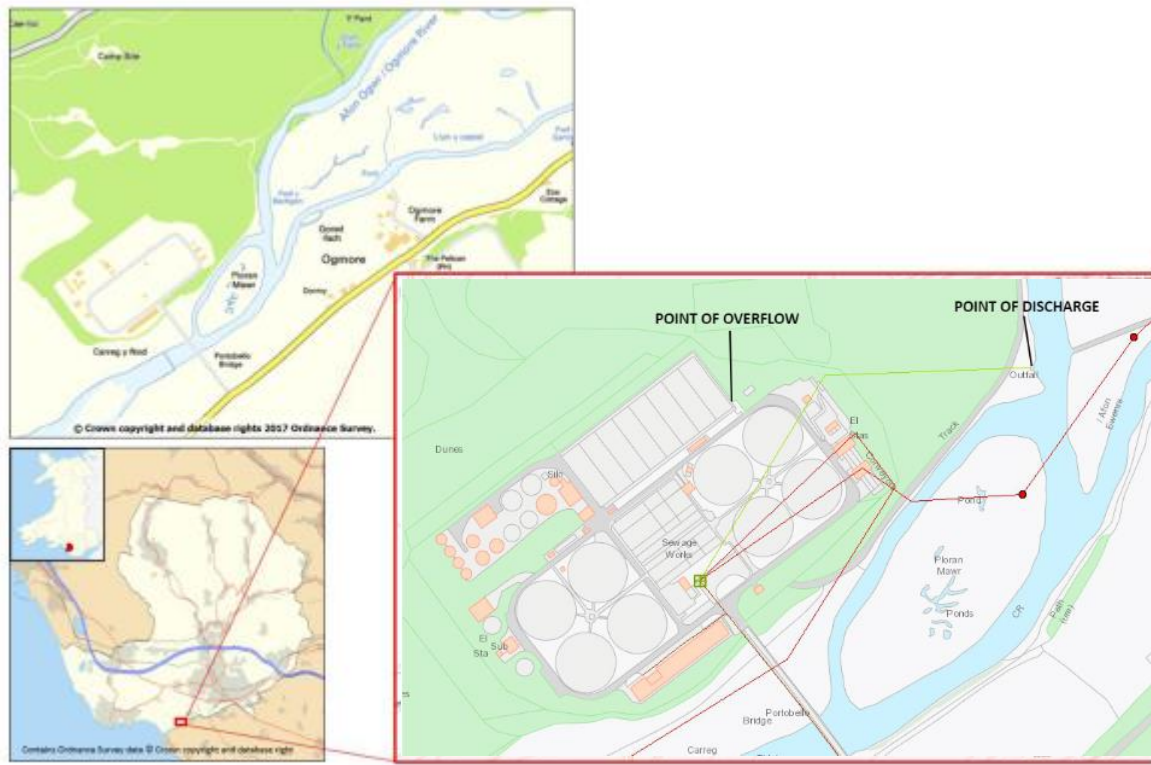


Figure 1: Location of Pen Y Bont WwTW, and catchment near Ogmore, Bridgend, Wales

2.2 Consent and EDM Requirements

This asset is permitted to discharge storm sewage under BW3206201, which is a consolidated permit referred to in the variation and consolidation notice for application PAN-006905 dated 06/09/2022. The notable conditions for discharge are:

- Overflow setting 1650l/s.
- Minimum storage capacity of 21896m³ fully utilised.
- Screen passing solid matter no greater than 6mm in 1 dimension.
- Discharge Point NGR SS 87825 76852.

The asset breached its EDM requirements on 05/08/2023 when it spilt for the sixth time during the bathing season as per the Spill Block Counting Method.

2.3 Asset and Telemetry Description

Penybont WWTW works provides treatment by means of screening, grit removal, primary settlement, aeration, final clarification, and UV disinfection.

Flows arrive at the works through a gravity network from Bridgend and a pumped main from Beach Road SPS, Porthcawl. Gravity flows arrive at the inlet pumping station, where they are lifted into the inlet channel: the pumped flow from Beach Road enters at the inlet channel.

The inlet channel flows via gravity into the storm screen channel. In storm conditions, flow overtops the weir walls and discharge through 2 screens into 8^{no} 2737m³ storm storage tanks (total capacity of 21,896m³).

The consented pass forward flow of 1650l/s is controlled by an automated penstock. When all 8 storm tanks are full, excess storm water entering the system discharges to the storm water outlet channel. Flow is measured prior to discharge to the Ogmore Estuary via a 1675mm diameter outfall pipe (Nat. Grid Ref. SS 87825 76852). After storm cessation, the storm tanks are emptied, and their contents returned for full treatment.

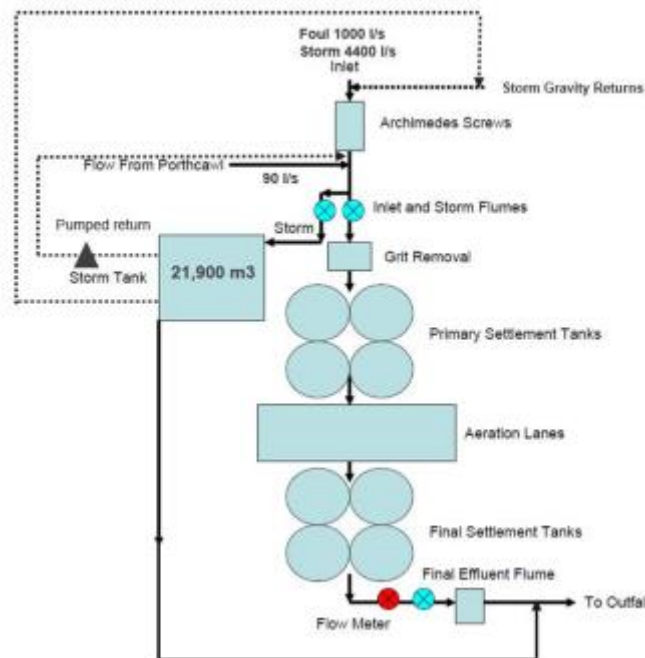


Figure 2: Schematic representation of the Penybont WwTW process

Monitoring of the spills from the storm tanks is undertaken in the outlet storm channel via an ultrasonic level sensor reporting back through the site telemetry SCADA system.

3.0 Desktop Study

3.1 Telemetry Data Analysis

A review of the telemetry data has been carried out for the period of recorded spills across the 2023 bathing water season. Data sets for spills are consistent with response to rainfall events in the catchment and also other monitored assets in the surrounding area. All discharges occurred when the permit requirements were met i.e., inlet flows exceeded 1650l/s, and storm tanks were utilised to full capacity (21,896m³) prior to any spills taking place.

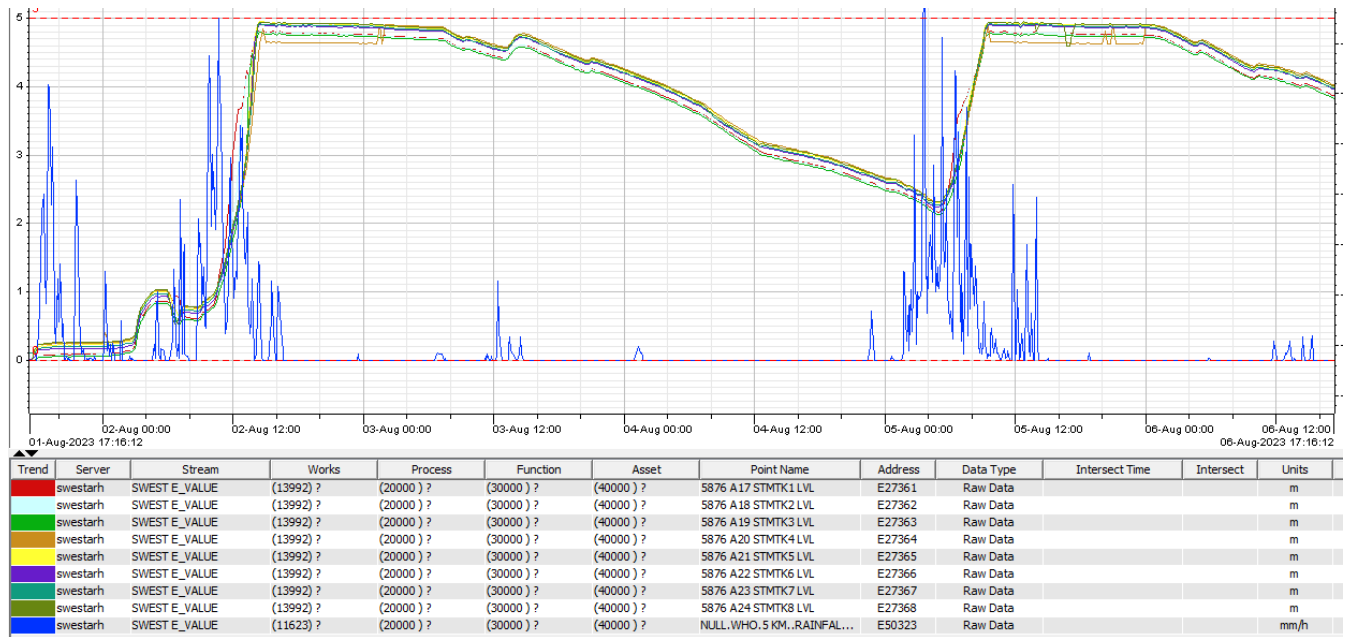


Figure 3 - Blue displays rainfall. All other colours represent the 8 storm tanks. Data indicates direct link to rainfall events and suggest hydraulic overload issues, leading to excess flows being passed to storm tanks.

3.2 Catchment Review

A Sustainable Drainage Plan was undertaken for the Pen-Y-Bont catchment in AMP6.

It identified that growth of over 4000 new dwellings to be projected in the long term, and that this would add significant flow to an already overloaded network.

The likely long-term interventions would be to upsize the trunk sewer leading to the WWTW and also upsizing the capacity of the WWTW. These will be taken into consideration when solutions are being conceptualised.

4.0 Initial Investigation Conclusions

4.1 Root cause statement

The definitive root cause of CSO spill frequency cannot be firmly established at this time but will likely be attributed to hydraulic overload at the asset due to high volumes of network flows being received and exceeding the assets' operational capacity.

Significant further investigation work will be required to confirm.

4.2 Root cause Investigations and work undertaken.

Investigation works have been undertaken and a review of STW operational control philosophy, current performance and asset condition did not identify anything to suggest any issues within the STW to be the root cause of the spills.

Storm tanks were able to fully empty and return flows following rainfall events, with the exception of the spill event block dated 5th August 2023. On this occasion, the tanks had only drained by half following the previous event dated 2nd August 2023, before another rainfall event required excess STW flows to be passed to the storm tanks and generated the subsequent spill blocks.

4.3 Further Work Required

Given the scale of the asset and associated flows, further investigation works will be escalated for DCWW Capital Alliance Intervention, and will consist of upstream catchment investigations, flow modelling and review of SDP outputs.

4.4 Initial Investigation Recommendations

Once monitors are installed, there will need to be a period of data collection to allow for further detailed root cause to be undertaken.

Welsh Water aim to complete the initial stage of installing monitors by 1st April 2024.