



DŴR CYMRU WELSH WATER

EVENT DURATION MONITORING

December
2024

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**EDM TEN Initial investigation report
B05109601
Penclawdd CSO, Swansea**

Asset ID No. 72084

DOCUMENT CONTROL

Version	Status	Date	Author(s)	Description of Change
1	Initial draft	31/10/2023	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

1.0 Executive Summary

Penclawdd CSO is permitted to discharge under Permit BO5109601 to Burry Estuary, Penclawdd, Swansea.

The asset breached its EDM requirements on 26/7/2023 when it spilt for the 26th (twenty-sixth) time during 2023 as per the Spill Block Counting Method.

Desktop studies and asset investigations are ongoing, subsequently the root cause cannot be established at this time. Continued investigation work is required to confirm.

15 spills were between the 1st and 15th January 2023, this was over a prolonged period of heavy rain, there looks to have been an issue with the pass forward flow from the site, however this may be down to the accuracy of the flow meter because the pumps were continuously running.

Maintenance works were carried out on the pumps in Penclawdd SPS in May 2024 and the pass forward flow has been restored. Spills have since dropped off to expected levels.

2.0 Site Information

2.1 Site Location

The area of Penclawdd is a village in the SA4 region, located in the North of the Gower Peninsula, Swansea.

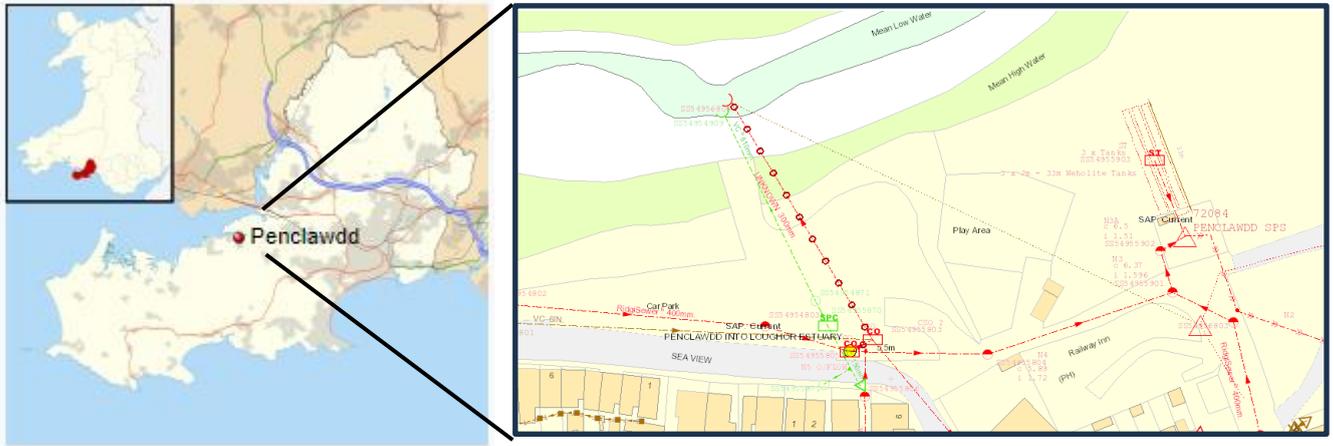


Figure 1: Location of Penclawdd CSO, Penclawdd, Swansea, Wales

2.2 Consent and EDM Requirements

Penclawdd CSO is permitted to discharge under Permit BO5109601. The notable conditions for discharge are:

- Storage of 300 cubic metres (at Penclawdd SPS) must be fully utilised AND
- Flow rate at the CSO must be in excess of 82l/s
- Screen passing solid matter no greater than 6mm in 1 dimension.
- Discharge Point NGR SS 54495 95950

The asset breached its EDM requirements on 26/7/2023 when it spilt for the 26th (twenty-sixth) time during 2023 as per the Spill Block Counting Method.

2.3 Asset and Telemetry Description

Penclawdd CSO receives flows from a significant area consisting of Penclawdd, Crofty, Llanmorlais and Wernffwrdd. The catchment upstream covers an area of approximately 2.38sq. km and consists of mainly residential properties in addition to receiving trade effluent flows from Crofty Industrial Estate. It also serves as an Emergency Overflow for Penclawdd SPS (asset: 72084) approximately 100m downstream.

Discharges at the CSO are monitored with a 'CELLO' ultrasonic sensor, used for EDM purposes. Pass forward flow is controlled by the diameter of the outgoing pipe and capacity of the downstream network, storage tanks and SPS performance.

When the SPS fails or reaches inflow capacity the level fills up the 300m³ storage tanks. Once these are full, the level backs up in the CSO. This goes up through a screen which divides the CSO chamber into two levels. Once through the screen the sewage spills over a weir wall and into the overflow pipe, where it discharges at its consented point approximately 75m away.

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 in 2023. Data sets for spills are consistent with response to rainfall events in the catchment and also other monitored assets in the surrounding area.

15 spills were between the 1st and 15th January 2023, this was over a prolonged period of heavy rain. Figure 2 demonstrates pump performance at SPS, with a maximum pass forward flow of approximately 60l/s. This would suggest an issue with the pass forward flow from the site, however this may possibly be attributed to the accuracy of the flow meter because the pumps were continuously running.

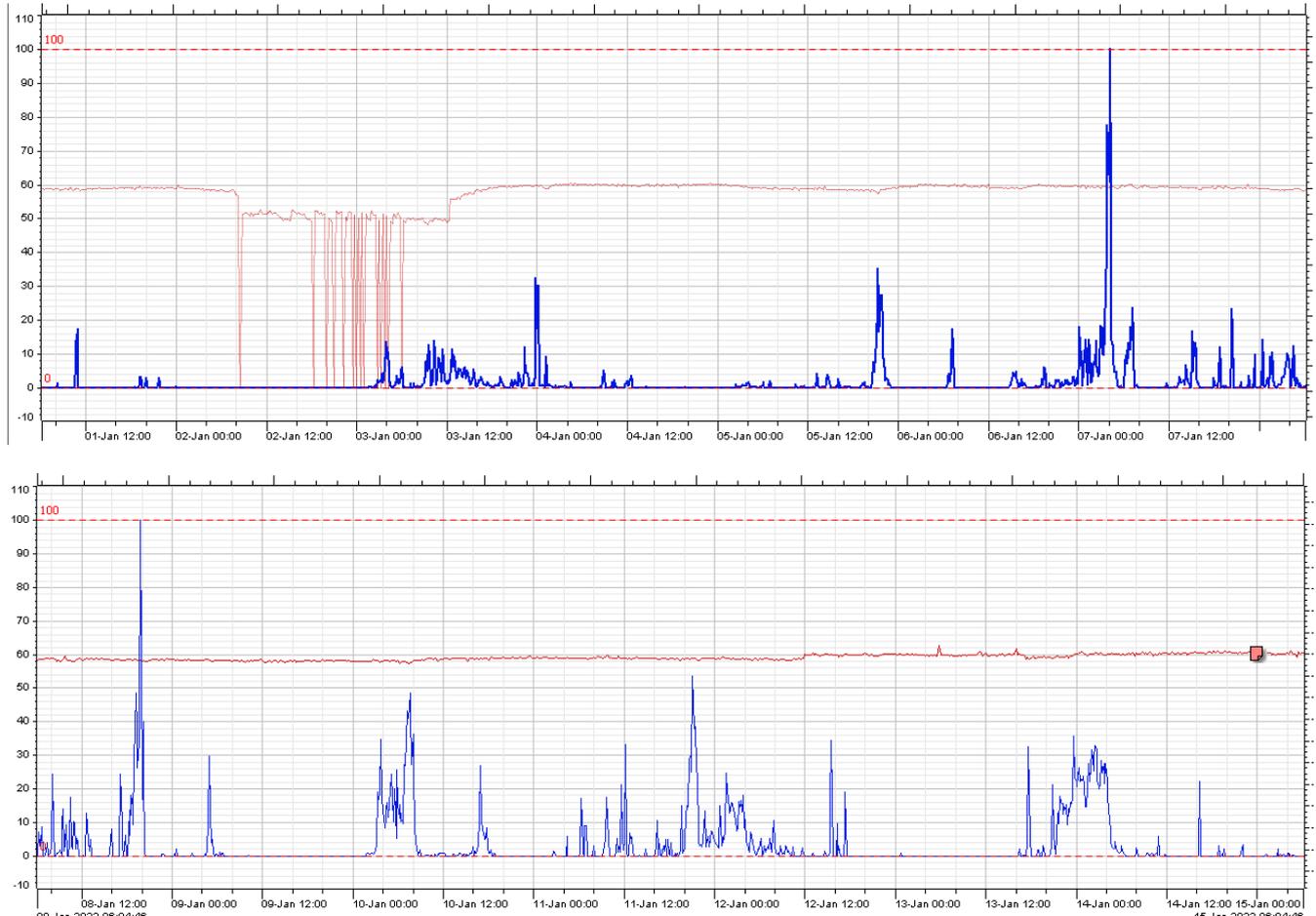


Figure 2 - Red displays volume of pumped flow at SPS. Blue displays rainfall. Data indicates direct link to rainfall events.

Figure 3 shows a comparison between levels at the SPS compared to levels at the CSO, and it can be confirmed that spills have only occurred when SPS wet well levels are high.



Figure 3 - Red displays levels at CSO. Dotted red line indicates spill level. Blue displays rainfall. Black displays SPS wet well levels. Data indicates direct link to rainfall events, and spills occurring only when SPS wet well levels are high.

3.2 Catchment Review

There is currently no Sustainable Drainage Plan scheduled for the catchment.

4.0 Initial Investigation Conclusions

4.1 Root cause statement

The root cause of CSO spill frequency cannot be fully established at this time and requires further investigation work to confirm.

The pumps are now showing a consistent pass forward flow of 70 l/s with a maximum flow rate in extreme rainfall of 75 l/s. This is only an indication of flow as the flow monitor may need clarification.

The SPS is working best with assisted head, however at this stage the tanks would already be utilised, the CSO is already spilling.

4.2 Further Investigations and work required

Investigation works consist of:

- Network investigations to ensure free passage of flow downstream of CSO
- Investigation of current storage tank condition and capacity
- Review of SPS operational performance
- Review of the rising main including airvalves

4.3 Initial Investigation Recommendations

Once the further investigation works have been completed, there may be a need to model the catchment using the information we have gathered.

We aim to complete the investigation works by April 2024.

Stage 5: Implement Solutions

Stakeholder Communication

PFF returned to 82 l/s on 2nd May 2024, since this date the pumping station has been consistently exceeding its PFF consent of 82 l/s before spills occur. The number and duration of spills has dropped.

The following telemetry trends show the 82 l/s being achieved. In figure 4 it is evident that the asset didn't spill and the pumping station was passing forward 82 l/s.

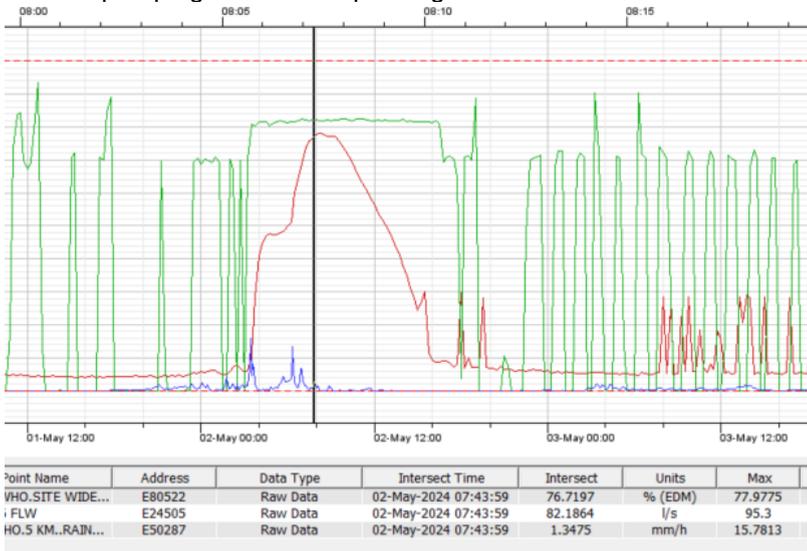


Figure 4 - Red displays levels at CSO. Dotted red line indicates spill level. Blue displays rainfall. Green displays SPS Pass forward flow.

Stage 6: Close Out Report

Spill Reduction Performance

There have been 9 spills since the PFF has been restored at the down stream pumping station. All have been attributed to high rainfall intensity storm events. The following figure shows the SPS reaching a consistent 85 l/s with spike to 100 l/s.

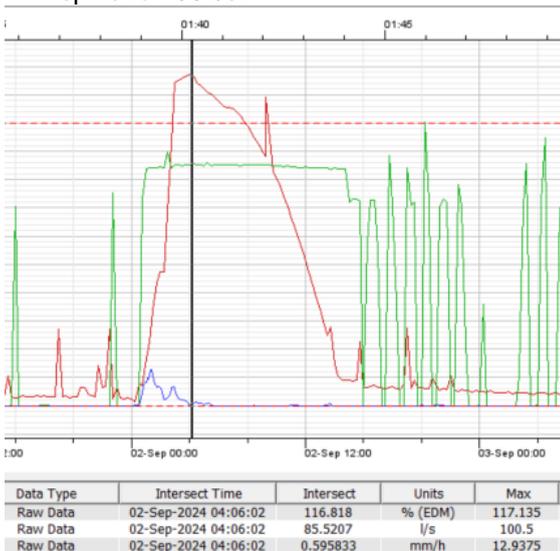


Figure 5 - Red displays levels at CSO. Dotted red line indicates spill level. Blue displays rainfall. Green displays SPS Pass forward flow.

Trigger Exceedance Close Out Statement

The spills at this asset were due to Penclawdd SPS not achieving its full pass forward flow. Maintenance works have been undertaken at the pumping station and spill numbers have been reduced.