

Eirianfa Holiday Park, Berwyn Street, Llangollen

Report Reference: PAN-030868 - Surface and Foul Water Management Plan

Prepared by: Andrew Brundan MRICS (on behalf of Hereford Dwellings Company Ltd)
Prepared for: Natural Resources Wales (NRW) – Environmental Permitting Team **Date:**
March 11, 2026 **Version:** 1.0

1. Introduction

This Surface and Foul Water Management Plan (the "Plan") outlines the management, operation, maintenance, and monitoring protocols for the package treatment plant (PTP) handling foul water and the surface water drainage system at Eirianfa Holiday Park, Berwyn Street, Llangollen. The Plan is prepared in support of Environmental Permit Application Reference PAN-030868 for the discharge of treated domestic effluent to the River Dee.

The development involves demolishing three existing holiday units (served by an unregulated septic tank) and constructing 22 new holiday lodges (88 population equivalents, PE, at maximum occupancy of 4 persons per lodge). The site is within the River Dee and Bala Lake Special Area of Conservation (SAC) catchment, which is failing phosphorus (P) targets. The Plan ensures compliance with NRW's nutrient neutrality principles, achieving a net phosphorus betterment of -1.877 kg TP/year (or -2.252 kg TP/year with a 20% precautionary buffer), as calculated using the Welsh Government Nutrient Budget Calculator (June 2025 version).

Key system components include:

- **Foul Water System:** Marsh Ensign Ultra:Polylok PTP with GEM:APS add-on for phosphorus removal, discharging to the River Dee.
- **Surface Water System:** Sustainable Drainage Systems (SuDS) comprising three crate soakaways with bioretention planters.

This Plan incorporates details from the email correspondence dated February 4, 2026 (from Marsh via Andrew Brundan), referencing the Operations Manual for the Marsh Ensign and GEM:APS systems. It also aligns with the Drainage Strategy Drawing (Ref: 24137-HWC-00-xx-DR-C-2002 P05) and NRW feedback on chemical dosing (aluminium-based, 1.5 L assumed, removed during de-sludging).

The Plan will be reviewed annually or following any system modifications, with updates submitted to NRW as required.

2. Site Description

- **Location:** Eirianfa Holiday Park, Berwyn Street, Llangollen, Denbighshire, Wales (Grid Ref: SJ 21700 42200).
- **Site Area:** 1.5 hectares, partially brownfield with woodland edge and fields.
- **Development Overview:** 22 two-bedroom holiday lodges, office/bin storage (total impermeable area: 2,050 m² including 10% urban creep allowance). Existing unregulated septic tank (serving 3 units, ~6,000 L capacity, circa 2005) to be decommissioned and removed.
- **Hydrology:** Site drains to the River Dee (SAC). Annual rainfall: 1,250 mm (NRFA Llangollen gauge). Soil: Freely draining sandy gravel (infiltration rate: 1.46×10^{-4} m/s from June 24, 2025 tests). No flooding in 100-year +40% climate change storm events.
- **Baseline Conditions:** Pre-development landcover: 100% brownfield/woodland edge (TP export: 0.25 kg TP/ha/year). Existing unregulated septic discharge: 12 PE at 150 L/PE/day = 1.8 m³/day, TP at 9 mg/L = 5.913 kg TP/year (to be eliminated).
- **Post-Development:** 11.5% impervious surfaces + 88.5% greenspace (weighted TP export: 0.20 kg TP/ha/year). Foul discharge: 88 PE at 150 L/PE/day = 13.2 m³/day average (4,818 m³/year), controlled at 0.15 L/s via headwall/flap valve (invert ~2.00 m above max river levels).
- **Environmental Sensitivities:** Proximity to River Dee SAC (features: Atlantic salmon, floating water-plantain). No adverse effects per HRA Stage 2 Report; SuDS achieve 75% TP removal (CIRIA C753).

3. System Description

3.1 Foul Water System

- **Components:**
 - 2 No. Marsh Nutra Lite NL45 units (or equivalent multi-tank configuration) for primary biological treatment.
 - GEM:APS add-on unit for advanced phosphorus removal via chemical dosing and precipitation.
 - MUV P2 filter for final polishing.
 - Discharge pipe: 150 mm, to River Dee outlet (as per NRW permit under review).
- **Design Standards:** Certified under BS EN 12566-7 Annex A (PIA GmbH). Effluent quality: TP 0.9 mg/L (certified; conservative application), <10 CFU coliforms.
- **Phosphorus Removal Mechanism:** Primarily chemical dosing (aluminium-based coagulant for precipitation in the aerated GEM:APS unit post-primary treatment), supplemented by biological uptake in main stages. Dosing rate: Assumed 1.5 L/aluminium, replenished approximately twice monthly. Sludge containing precipitated phosphates removed during de-sludging.
- **Flow:** Average 13.2 m³/day (88 PE × 150 L/PE/day); annual 4,818 m³. 100% external catchment users (precautionary).
- **Power and Alarms:** Electrical supply to treatment units, alarms, and vents per manufacturer's recommendations.

3.2 Surface Water System

- **Components:** Separated from foul water. Rainwater pipes (RWPs) and inspection chambers (ICF) feed into three crate soakaways (Graf EcoBloc or similar, 95% void ratio, minimum 800 mm cover).
 - **Soakaway 1:** 13 m³ storage; dimensions 25.6 m × 1.6 m × 0.35 m; BOT 97.550, TOT 97.900, CL min 98.700. Serves 700 m² impermeable area.
 - **Soakaway 2:** 12 m³ storage; dimensions 16 m × 2.4 m × 0.35 m; BOT 94.800, TOT 95.150, CL min 96.950. Serves 650 m² impermeable area.
 - **Soakaway 3:** 43 m³ storage; dimensions 20 m × 6.4 m × 0.35 m; BOT 94.300, TOT 94.650, CL min 95.500. Serves 700 m² impermeable area.
 - Bioretention planters (150 L capacity) for additional treatment.
- **Design Standards:** Infiltration-based SuDS per CIRIA C753. Total storage: 68 m³. Exceedance routes ensure no flooding in extreme events; 75% TP removal efficiency.
- **Pipes:** 150 mm diameter; structured wall (BS EN 13476) or PVC-U (BS EN 1401) for <300 mm; concrete (BS 5911) for ≥300 mm. Bedding/backfill per location (e.g., Class S for roads <1.2 m cover).

4. Installation

- **Pre-Installation:** Site survey to confirm tie-ins, levels, and existing land drains (reconnect as needed). Decommission existing septic tank: Pump out, remove, and backfill per NRW guidance.
- **Construction:** Per Drainage Strategy Drawing P05 and manufacturer's Ops Manual (Marsh Ensign and GEM:APS). Install in accordance with Building Regulations 2010 (Approved Document H), British Standards, and Health & Safety at Work Act 1974/CDM Regulations 2015. Temporary protection during works.
- **Testing:** Post-installation hydrostatic testing for pipes/chambers; infiltration tests for soakaways. Commissioning by certified installer (e.g., Marsh-recommended local agent).
- **Timeline:** Post-planning approval; coordinate with NRW permit issuance.

5. Operation

- **Foul System:** Continuous operation via biological aeration and chemical dosing. Monitor flow (0.15 L/s max). Replenish aluminium coagulant twice monthly or as per low-level alarm.
- **Surface System:** Passive infiltration; no active controls required. Ensure planters are vegetated for optimal bioretention.
- **General:** Systems operational upon lodge occupancy. No discharge during construction. All users (holiday guests) briefed on non-flushable items (e.g., via site handbook).

6. Maintenance Schedule

Maintenance per Marsh Ops Manual and email from Marsh (February 4, 2026). Recommend entering a service agreement with local agents (e.g., Marsh-recommended providers).

6.1 Foul Water System

- **Monthly:** Inspect units for blockages; replenish chemicals (1.5 L aluminium assumed); check alarms/power.
- **Quarterly:** Sample effluent (TP, BOD, SS per permit limits); clean filters.
- **Annually:** Full service by qualified technician; de-sludge GEM:APS and Ultra:Polylok (intervals aligned; remove ~1.5 L aluminium sludge).
- **As Needed:** Emergency de-sludging if capacity exceeded.

6.2 Surface Water System

- **Monthly:** Inspect soakaways/planters for ponding; clear debris from RWPs/ICF.
- **Bi-Annually:** Weed planters; check infiltration rates.
- **Annually:** Full inspection; sediment removal from chambers.
- **Post-Storm:** Clear exceedance routes.

Records maintained on-site; submitted to NRW annually or upon request.

7. Monitoring and Reporting

- **Parameters:** Effluent: TP (target <0.9 mg/L), flow, pH. Surface: Infiltration performance.
- **Frequency:** Quarterly sampling by accredited lab; annual report to NRW.
- **Compliance:** Align with permit conditions (e.g., no adverse SAC impact). Report incidents (e.g., spills) to NRW within 24 hours.
- **Audits:** Allow NRW access for inspections.

8. Emergency Procedures

- **Spills/Failures:** Isolate system; notify NRW (0300 065 3000) and emergency services if pollution risk. Backup: Temporary tanker storage.
- **Power Outage:** Generator backup for PTP.
- **Flooding:** Flap valve prevents backflow; exceedance routes direct overflow away from SAC.

9. Responsibilities

- **Operator:** Hereford Dwellings Company Ltd – Overall compliance, maintenance coordination.
- **Site Manager:** Daily oversight; guest education.

- **Service Provider:** Marsh-recommended agents for technical maintenance.
- **NRW:** Permitting and enforcement.

Contact: Andrew Brundan (07500 899 290).

10. References

- Welsh Government Nutrient Budget Calculator (June 2025).
- Marsh Ensign Ops Manual (as referenced in February 4, 2026 email).
- Drainage Strategy Drawing (24137-HWC-00-xx-DR-C-2002 P05).
- NRW Principles of Nutrient Neutrality (November 2025).
- CIRIA C753 (SuDS Manual).