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Greenbank Road
Eden Business Park
Gilwilly, Penrith
Cumbria, CA11 9FB

Forest Holidays Ltd – Beddgelert

Drainage Strategy

Rev D – 25.11.24

Surface Water Management

Structures

The roof structures of all proposed buildings, including the existing cabins on-site, will not include gutters or downpipes. Instead, all roof run off will discharge directly to ground via infiltration strips constructed beneath the eaves.

This SuDS-based approach ensures that all surface water is managed sustainably, promoting ground infiltration and maintaining water quality. By avoiding hard drainage infrastructure, this method fully aligns with the principles of sustainable drainage systems (SuDS), including water quality considerations.

Roads

New access roads will utilise porous construction materials or incorporate edge infiltration strips to manage runoff. These SuDS techniques ensure that all runoff from roads is similarly disposed of directly to ground, minimizing environmental impact and aligning with National Planning Policy.

Summary

All surface drainage for the development is designed to incorporate SuDS principles:

- Roof Drainage: Discharges directly to ground via infiltration strips.
- Road Drainage: Managed through porous surfaces or edge infiltration.

This approach complies with National Planning Policy and the Interim Code of Practice for Sustainable Drainage.

Foul Water Disposal

Existing Infrastructure

The development will utilise the existing activated sludge treatment plant, upgraded as necessary to meet environmental and regulatory standards.

The wastewater generated from daily applications flows by gravity into the primary settlement chamber. This stage of the treatment process is recycled to ensure effective primary settlement and balance within the system's operation.

Effluent is then transferred in a controlled manner to the main biological treatment unit, which incorporates a KEE BioDisc system. This system includes a final settlement process. The KEE BioDisc is recognized as one of the most cost-effective packaged treatment solutions currently available.

The system is designed to meet the effluent treatment parameters required for compliance with the current NRW permit. Additionally, it is managed under a comprehensive maintenance program, ensuring all servicing is performed according to the manufacturer's specifications.

Regulatory Compliance

We acknowledge that Natural Resources Wales (NRW) is revising the discharge permit to reflect the Special Area of Conservation designation for the Glaslyn catchment. The new permit will include:

- Phosphorus Numerical Limits
- Revised Biological Oxygen Demand (BOD) Limits

Effective by 2030, these changes will require treatment plant upgrades to ensure compliance. The proposed upgrades will incorporate modern technologies to improve efficiency and reduce operating costs.

Proposed Drainage Layout

As indicated in Tweddell and Slater Ltd drawing No. 8237 C-P-DN-01, the foul drainage system will include a mix of gravity flow and pumped rising mains, as dictated by site topography.

Hot Tub Drainage

Challenges of Direct Connection

Hot tubs in the proposed 22 cabins will be drained weekly (50% on Mondays and 50% on Fridays, between 10 am and 4 pm). Direct connection of hot tub effluent to the treatment plant poses risks:

- **Bromine Impact:** Bromine disinfectants in hot tubs can kill essential bacteria in the treatment plant, reducing treatment effectiveness.
- **Hydraulic Overload:** Simultaneous drainage of 22 hot tubs (~33m³ of effluent) could overload the system.

Proposed Solution

To mitigate these risks, a separate treatment system for hot tub effluent will be implemented:

1. **Diversion:** Effluent will be directed to dedicated treatment tanks during drain-down periods.
2. **Balancing Tank:** A 45,000-litre tank will collect effluent.
3. **Reaction Tank:** Effluent will flow into a 30,000-litre bromine reaction tank.
4. **Bromine Neutralization:** Bromine will be neutralized using liquid thiosulphate dosed over a managed cycle:
 - Initial Mixing: 10 minutes on, 20 minutes off for 6 hours.
 - Extended Mixing: 6 hours on, followed by 1 hour on, 4 hours off (24-hour cycle).
5. **Controlled Discharge:** Treated effluent will rejoin the main foul drainage system for standard treatment.

Management Procedures

Management procedures include:

- **System Monitoring:** Daily checks, weekly visual sampling, and monthly outfall analysis.
- **Maintenance:** Regular servicing of the treatment system by approved contractors, as per manufacturer recommendations.
- **Environmental Compliance:** Forest Holidays' Environmental Management Systems (EMS) will ensure effective operation and timely adjustments as needed.

Flood Protection

Flood Risk Assessment

The development site has been designed to ensure cabins are located outside the 100-year and 1,000-year flood zones:

- **Flood Modelling:** HecRas channel modelling confirmed alignment with NRW flood maps, showing a conservative difference of just 60mm.

- Cabin Relocation: Following consultation with NRW, cabins were relocated outside the C zone, negating the requirement for further flood consequence assessments (FCA).

Summary and Compliance

This drainage strategy demonstrates compliance with all relevant planning and environmental regulations:

- Surface Water: Fully managed using SuDS, ensuring no impact on water quality and alignment with National Planning Policy.
- Foul Water: Upgraded activated sludge treatment plant ensures future compliance with phosphorus and BOD limits.
- Hot Tub Effluent: Innovative separation and treatment ensure protection of the treatment plant and regulatory compliance.
- Flood Protection: Proactive measures ensure no flood risk to the development.

Forest Holidays remains committed to environmental stewardship and compliance, ensuring this development integrates seamlessly with the surrounding natural environment.