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10 PROPOSED HOLIDAY LODGES AND 4 GLAMPING PODS - LPA REF PA/2025/697

AT BUTTERSWOOD LODGE
SOFF LANE, GOXHILL, NORTH LINCOLNSHIRE

FLOOD RISK ASSESSMENT
AND SURFACE WATER DRAINAGE STRATEGY

FULL PLANNING APPLICATION

September 2025

Introduction

This combined Flood Risk Assessment (FRA), and Surface Water Drainage Strategy has been prepared for the proposed holiday lodges and glamping pods development at Butterswood Lodge, Soff Lane, Goxhill. The application site is approximately 1.79 hectares in area and lies in Flood Zone 1 (low probability of river or sea flooding). An FRA is required due to the site area exceeding 1 hectare, in accordance with national policy and Lead Local Flood Authority (LLFA) requirements. This document assesses all potential sources of flooding and outlines a drainage strategy following the sustainable drainage hierarchy. It is intended to address the comments of statutory consultees (notably the LLFA) and demonstrate that the development will be safe from flooding, will not increase flood risk elsewhere, and will employ appropriate sustainable drainage measures.

Site Description

Location & Current Use: The site is situated at Butterswood Lodge (also known as Butterswood Lakes), on the outskirts of Goxhill. It forms part of an established leisure and tourism facility that includes fishing lakes, existing holiday cottages, and caravan/camping pitches. The development area is generally flat grassland formerly used for touring caravans and camping, with mature trees and hedgerows around the boundaries. Existing man-made fishing lakes lie adjacent to the site, which contribute to the site's drainage characteristics and amenity.

Topography & Drainage: The ground elevation is relatively uniform with gentle gradients directing surface water towards the existing lakes and low-lying areas on site. There are no natural watercourses crossing the development area. However, the site lies in a rural catchment with field drainage ditches in the vicinity. Currently, rainfall on the site either infiltrates into the permeable soil or ponds in depressions, some of which communicate with the fishing lakes. The existing drainage pattern is thus a combination of natural infiltration and surface runoff flowing into on-site water bodies or adjacent ditches. There are no public surface water sewers serving this countryside location. Ground conditions are assumed to be relatively permeable, given the presence of lakes and the site's use for fishing and camping.

Environmental Setting: The site is not known to be contaminated and is greenfield in character (aside from the existing leisure uses). Surrounding land is predominantly agricultural fields and open space. The nearest significant waterbody is the Humber Estuary, several kilometres to the north, well beyond the site's local catchment. The site is not within any designated Critical Drainage Area. Being in Flood Zone 1, the site is at low risk of fluvial flooding, but careful consideration must be given to surface water drainage due to the development's size and introduction of new hard surfaces.

Proposed Development

Description of Development: The proposal is to station 10 holiday lodges and 4 glamping pods (shepherd's hut style) on the site, along with associated internal access roads, parking, and landscaping. All units will be single-storey, lightweight structures for short-term holiday accommodation. The lodges will likely be timber-clad or similar, and the pods are small cabins, all designed to blend with the rural setting. The development layout is low-density, retaining existing trees and hedgerows wherever possible, and includes substantial new planting to enhance biodiversity and screening. A new permeable access track will loop through the site, with turning areas at either end, connecting to Soff Lane.

Drainage & Landscaping Integration: The masterplan has been developed to work with the landscape. Notably, existing features are to be retained as part of the landscaping scheme, which will serve both as amenity features and as attenuation for surface water. These water features are situated at low points in the site to naturally collect runoff. Roofs of the lodges and pods will be modest in area; together with the access road, the development will introduce some impermeable surfaces, but overall site coverage remains low. The design intention is that surface water management is integrated into the existing ponds. By incorporating these features, the scheme will ensure that post-development runoff does not exceed pre-development rates. Foul water from the lodges/pods will be handled separately via a new package treatment plant system and will not connect into the surface water system.

Flood Risk Assessment

Flood Zone Classification and Policy Context

The entire site is within Flood Zone 1 (lowest risk), as defined by the Environment Agency (annual probability of river or sea flooding $<0.1\%$). This means the site is outside of any known 1 in 1000 year floodplain. According to the National Planning Policy Framework (NPPF) and local policy, all development in Flood Zone 1 larger than 1 hectare must be supported by a site-specific FRA to ensure flood risks are properly evaluated. In line with NPPF Paragraphs 159 and 167, this FRA considers all sources of flooding and confirms that the development will not increase flood risk elsewhere. The LLFA, in its consultation response, has specifically requested an FRA covering the site's flood risk (including consideration of overland flow paths) and a drainage strategy following sustainable drainage principles. This section addresses those requirements.

Potential Flood Risks

All potential sources of flooding have been assessed for the site:

- Fluvial (River) and Tidal Flooding: There are no main rivers in the immediate vicinity of the site. The nearest significant watercourse is the Humber Estuary, but the site lies inland and elevated such that it is not impacted by tidal flooding

(confirmed by Flood Zone 1 designation). There is no history of fluvial flooding on site. The risk of flooding from rivers or the sea is very low.

- Surface Water (Pluvial) Flooding: Surface water flooding can occur from intense rainfall overwhelming local drainage. The site's flat topography means that heavy rain could lead to temporary ponding if not adequately drained. Existing overland flow paths in the area generally direct water toward the on-site lakes or the drainage ditches at field boundaries. According to available surface water flood risk maps, the site is not indicated to have significant flow paths, though some shallow pooling may occur in low spots. The development will be designed to manage heavy rainfall on-site, so the surface water flood risk is low and will be mitigated by the proposed drainage strategy. During construction and after development, care will be taken to maintain natural drainage routes – the site design will not obstruct any important overland flow route. Any minor existing flow across the site will be accommodated by new swales or directed towards the attenuation ponds.
- Groundwater Flooding: The presence of lakes suggests that groundwater may be near the surface in parts of the site, at least seasonally. However, there are no records of groundwater flooding at this location. The development will not include deep excavations or basements, minimising the risk of groundwater ingress. Lodges and pods will have raised finished floor levels, providing a buffer above any potential water table rise. The risk of flooding from rising groundwater is considered low, but the drainage design will also help by allowing groundwater and surface water interaction without causing flooding of structures.
- Sewer Flooding: There are no public sewers on site. Foul sewage will be managed privately, and there is no combined sewer system that could surcharge. Therefore, sewer flood risk is negligible.
- Artificial Sources (Reservoirs, Canals, Lakes): There are existing fishing lakes on the wider Butterswood Lodge site. These are relatively small and not impounded by large dams, so the risk of a catastrophic failure is minimal. Nonetheless, if extreme rainfall caused the lakes to overflow, water would spill into surrounding low areas. The impact on the lodges/pods is expected to be minor due to site grading and raised floor levels. There are no large reservoirs or canals nearby that pose a flood threat. Flooding from artificial sources is assessed as low risk.

In summary, the site is at low risk from all forms of flooding. The primary consideration is managing surface water runoff from the development so that flood risk is not increased on-site or elsewhere. This is addressed through a robust drainage strategy in line with sustainable drainage best practices.

Overland Flow Paths and Site Levels

It is important to ensure that the development does not inadvertently divert or block existing overland flow paths. A detailed topographic survey shows the land is generally flat with gentle falls toward the existing ponds. Any overland flow during extreme rainfall currently would tend to disperse across the field or collect in the ponds. The proposed site layout respects these natural drainage patterns.

The internal access road and any new landscaping features has be designed not to dam or impede flow. For instance, where the access track crosses low ground, it will be built at or near existing grade with shallow side swales or culverts if necessary to allow water to pass underneath. Similarly, the lodges and pods are small structures that will be elevated slightly above ground; they will not form barriers to flow. If any minor re-grading is done for landscaping (e.g. creating bunds or mounds), it will be planned so as not to cause water to back up onto neighbouring land. In essence, the development will maintain or improve the existing overland drainage by capturing runoff in designated features rather than letting it flow uncontrolled.

Climate Change Allowances

The design accounts for climate change impacts, particularly the projected increase in peak rainfall intensity. The surface water drainage strategy (next section) is based on accommodating at least the 1 in 100 year rainfall event plus a 40% allowance for climate change. This means the proposed drainage features will have capacity for more intense storms expected over the development's lifetime. Although fluvial flood risk is negligible, the slight potential rise in sea levels or river levels due to climate change does not affect this site given its location and elevation. By designing for a higher rainfall intensity, we ensure that surface water will be safely managed even under future climate conditions, reducing any residual flood risk.

Safe Development Considerations

Even in this low-risk setting, measures will be taken to ensure the safety of occupants and the resilience of the development:

- Finished Floor Levels (FFLs): All habitable buildings (lodges and pods) will have FFLs set at least 150 mm above the surrounding ground level. This standard precaution exceeds typical building regulations for damp-proofing and provides additional protection against any localised ponding of rainwater. In practice, the lodges may be constructed on pad foundations or short stilts, naturally elevating them above grade.
- Safe Access/Egress: Soff Lane and the routes to the site are within Flood Zone 1 and are not known to flood. During extreme rain, the internal access road is designed to remain passable – any excess water will flow in the swales beside the road rather than over the carriageway. This ensures that in the unlikely event of flooding on-site, there will still be dry access for occupants and emergency services. Evacuation or refuge is not expected to be necessary given the low risks, but as a precaution the site operators will monitor weather warnings. The single-storey lodges themselves provide safe refuge well above ground level if needed.
- No Increased Off-site Risk: A fundamental principle of this FRA is that the development will not increase flood risk elsewhere. By managing runoff on-site (through infiltration and attenuation), the proposal will avoid adding flow to adjacent land or overloading local drainage networks. In fact, by formalising drainage that is currently informal, the scheme is expected to reduce peak runoff rates leaving the site compared to the existing situation. This betterment contributes to improved flood protection for the downstream area.

Overall, the proposed holiday lodges and pods development is deemed safe and compliant with flood risk policy. It avoids high-risk flood zones, incorporates appropriate mitigation (elevated floor levels and sustainable drainage), and will remain safe for users under foreseeable flood conditions, including climate change scenarios. The following section details the surface water drainage strategy that underpins these conclusions.

Surface Water Drainage Strategy

Drainage Design Principles (SuDS Hierarchy)

The drainage strategy has been developed in line with the drainage hierarchy set out in the National Standards for Sustainable Drainage (SuDS), NPPF, and local (North Lincolnshire Council) SuDS guidance. The hierarchy prioritises managing water on-site through natural means:

1. Infiltration: Use infiltration techniques to discharge runoff directly into the ground (e.g. soakaways, permeable surfaces) where feasible.
2. Attenuation and Discharge to Watercourse: If infiltration is not feasible or sufficient, attenuate runoff on-site (e.g. in ponds or tanks) and discharge at a controlled rate to a nearby watercourse or ditch.
3. Discharge to Surface Water Sewer: Only if no infiltration or watercourse option is available – *not applicable here*as no public sewer exists and the preference is to avoid off-site sewer connection.
4. Discharge to Combined/Foul Sewer: *Not applicable* for this greenfield site, and would be a last resort.

Following this hierarchy, the strategy aims first to maximise infiltration on-site. Initial desk study suggests the soils are likely compatible with infiltration (being in a rural area with existing ponds). On-site soakaway testing will be carried out at detailed design stage to confirm infiltration rates. If results are favourable, the majority of roof and road runoff will be disposed of via infiltration-based SuDS. If infiltration capacity is limited (e.g. due to locally high groundwater or clay pockets), the strategy will shift to include attenuation and very limited discharge to the adjacent field drain network, restricted to greenfield runoff rates.

Proposed Drainage System

The proposed surface water drainage measures for the development are as follows:

- Permeable Surfacing: Wherever practical, hard surfaces will be permeable. The main internal access road can be constructed with a permeable gravel or porous asphalt finish, allowing rainwater to soak through the surface into the underlying soil. Parking areas and paths will use permeable materials (e.g. gravel or permeable pavers). This approach will significantly reduce the volume of direct runoff and promote ground infiltration at source.
- Roof Drainage: Each holiday lodge and glamping pod will have a roof drainage system (gutters and downpipes) discharging to adjacent soakaways or bio-

retention areas. A typical lodge will discharge into either a shallow crate soakaway beneath adjacent landscaping or into a raingarden (small vegetated depression) next to the unit. These features will allow roof water to infiltrate and provide some natural filtration of pollutants (like bird droppings or roof debris). For the glamping pods, rainwater can simply spread to surrounding grass, given their small size, or be directed to mini soakaway pits. All soakaway designs will comply with local soakaway guidance (ensuring at least 5 m from building foundations, etc.) and will be sized for the 1 in 30 year storm without flooding, with exceedance routed safely as described later.

- Swales and Filter Strips: Alongside the access track and at low points in the site, swales (shallow grassed channels) will be formed to convey and treat surface water. These swales serve a dual purpose: they collect runoff from the road and any overland flow, and they provide moderate infiltration as water percolates through the vegetated base. Check dams or berms within swales can be used to encourage ponding and soaking of water rather than rapid conveyance. Filter strips (grassed margins) next to driveways or lodges will also help intercept runoff, slow it down, and filter out sediments before water reaches the ponds or soakaways.
- Existing Ponds: A key element of the strategy is the inclusion of the existing ponds. These ponds will be used as collection points on site. During heavy or prolonged rainfall, excess water that doesn't infiltrate immediately will be directed to these ponds via swales or pipes. The ponds. Each pond currently has a controlled overflow/outlet: for example, an outfall to the nearest drainage ditch or watercourse, limited by an orifice. The discharge rate is restricted to the estimated greenfield runoff rate for the site (approximately on the order of 5 liters/sec) to retain pre-development conditions.
- Water Quality Measures: The sustainable drainage features inherently provide water quality treatment. Settling and filtration in swales and ponds will remove silt and contaminants from road runoff (like minor oil drips or tire particles). The incorporation of vegetated features (grasses, reeds, etc.) in swales and pond margins further aids in filtering pollutants (as per CIRIA SuDS guidance). Roof runoff, being relatively clean, is directly infiltrated but even so, passing it through shallow topsoil or raingardens provides some treatment. These measures align with the simple index approach for water quality in SuDS design (mitigating pollutant hazards from this type of development). Overall, the drainage strategy will protect the quality of receiving waters and the environment.
- Foul Drainage (separate system): Although not the main focus of this strategy, it is noted that foul water from the lodges and pods will be managed by a new private treatment system. This system will be designed and sited per Building Regulations to avoid any contamination of surface water bodies. Foul drainage is kept completely separate from the surface water network to eliminate the risk of foul sewage flooding in storm events.

This integrated approach to drainage ensures compliance with SuDS principles and addresses the requirements set by the LLFA for a comprehensive drainage plan. The design is preliminary and subject to detailed calculations and percolation test results, but it demonstrates that a feasible solution exists to drain the site sustainably.

Maintenance and Management

A successful drainage system requires a clear maintenance plan to ensure long-term effectiveness. The Butterswood Lodge site will remain under a single ownership/management, which will be responsible for maintaining all drainage infrastructure:

- Ponds: Inspect ponds annually and after major storm events for sediment accumulation, debris, and bank integrity. Remove sediment build-up from the pond base as needed (typically every 5-10 years, or when sediment volume exceeds 20% of design depth). Maintain any control structures. Manage vegetation by removing excessive weed growth and ensuring a healthy cover of beneficial plants (reeds, grasses) to maintain water quality function.
- Swales and Ditches: Mow swale vegetation periodically (e.g. 2-3 times during growing season) to keep grass at a manageable height and encourage dense cover. Remove litter and debris during inspections (at least quarterly). Check for erosion or channelling in swales; repair and re-seed bare patches if observed. Clear any sediment or obstructions in swale check dams or culverts annually.
- Soakaways and Permeable Surfaces: Permeable paving should be swept/vacuumed at least twice a year to prevent clogging of pores by dirt or organic matter. Soakaway inspection chambers should be monitored annually – during a heavy rain, verify that water is draining as expected and not remaining ponded for long periods. If infiltration rate seems reduced, a restorative maintenance (like high-pressure jetting of soakaway or replacing clogged stone) may be required. Roof guttering and downpipes leading to soakaways will be cleaned of leaves and debris annually (especially before winter) to reduce sediment input.
- Monitoring and Reporting: Keep a simple maintenance log documenting inspections, cleaning, and any repairs. This can be requested by the local authority to ensure compliance. Any issues (like unusual standing water, or damage to a pond embankment) should be addressed promptly by a qualified contractor. The site manager will designate personnel responsible for routine checks (for example, checking after heavy rain that no unexpected ponding occurs near lodges).

By adhering to this maintenance regimen, the drainage system will continue to operate as designed, ensuring long-term resilience against flooding. The maintenance plan will cover the lifetime of the development, and a condition to secure this is expected as part of the planning approval. Regular upkeep not only preserves flood protection but also maintains the aesthetic and ecological value of the SuDS features (clean water in ponds, healthy vegetation, etc.).

Conclusion

This Flood Risk Assessment and Drainage Strategy has demonstrated that the proposed development at Butterswood Lodge can proceed safely and sustainably with respect to flood risk and drainage. The site is in Flood Zone 1 and is not at significant risk from any flooding source (fluvial, tidal, surface, or groundwater). The development will not

exacerbate flood risk elsewhere; on the contrary, through the introduction of designed drainage features (infiltration measures and attenuation ponds), the post-development runoff will be controlled to greenfield rates or better, achieving a minor betterment in peak flow reduction. All aspects of the design follow national and local policy guidance for flood risk (NPPF) and sustainable drainage.

Key outcomes of the assessment are:

- Compliance with Policy: The development meets NPPF requirements (para 159 and 167) by steering new development to an area of lowest flood risk and managing runoff so as not to increase risk. It aligns with Local Plan policies CS19 / DS16 on flood risk and SuDS, as well as the LLFA's expectations for a drainage strategy.
- Safety: Future occupants and assets on site will be safe in the event of extreme weather. Floor levels will be raised appropriately and safe access will be maintained during storms. There is no need for flood evacuation plans given the low risk, but the design's inherent safety margins (freeboard, overflow routes) provide robust protection.
- Sustainable Drainage: A comprehensive SuDS scheme is proposed, prioritizing infiltration and on-site attenuation. This will effectively handle rainfall events up to the 1% AEP (1 in 100 year) plus climate change scenario without flooding. Water quality and biodiversity benefits are additional advantages of the chosen drainage solution.
- Maintenance Commitment: Long-term management arrangements will be put in place to ensure the drainage infrastructure remains functional and effective for the life of the development, preventing any degradation in performance over time.

In conclusion, the development can be delivered in a manner that is acceptably safe from flooding and environmentally sustainable in drainage terms. The mitigation measures and design approaches outlined in this document should be secured via appropriate planning conditions. With these measures implemented, the scheme will satisfy the requirements of the planning authority and LLFA, allowing the project to proceed without adverse flood risk impacts.