Case Study

Geosynthetics

Precision Engineering for Sustainable Slope Stabilisation

Broadnook Garden Village Erosion Control

Contractor: NT Killingley

Broadnook Garden Village , Leicester, LE7 6AH

Sector: Residential

Project Overview

At Broadnook Garden Village, a premier "Garden Suburb" development in Leicestershire, the project team faced a critical requirement for long-term erosion control on newly constructed embankments.

The objective was to establish a sustainable, vegetated finish on steep slopes that would integrate seamlessly with the development's green infrastructure whilst ensuring structural integrity against hydraulic actions.

Geosynthetics Ltd was able to provide a high-performance solution that met stringent engineering standards for soil retention and surface protection.

The Challenge

The embankments at Broadnook presented significant technical constraints. The primary challenge was the vulnerability of the topsoil to heavy rainfall and surface run-off during the critical vegetation establishment phase.

Traditional seeding methods alone were insufficient to prevent soil migration and gullying on the steep gradients.

The project required a solution that could:

- Provide immediate surface stability against hydraulic shear forces.
- Retain topsoil and seed in situ to facilitate uniform germination.
- Offer a permanent, non-degradable reinforcement layer to support the root matrix.
- Comply with UK environmental and engineering reliability standards.

Innovative Solutions:

Geosynthetics Ltd specified EnkaMat™ 7020, a high-performance, three-dimensional permanent erosion control mat. Unlike temporary degradable blankets, EnkaMat™ 7020 is engineered from a resilient polyamide (nylon) monofilament matrix.

The system was implemented with a specific engineering rationale:

- **Volumetric Matrix:**
  The 95% open structure of EnkaMat™ 7020 allows for total soil infill, ensuring the matting is fully integrated within the soil profile.
- **Root Reinforcement:**
  The monofilaments act as a "synthetic root" system, increasing the permissible shear stress of the vegetated surface.
- **Durability:**
  The use of polyamide ensures the product maintains its mechanical properties even when exposed to fluctuating moisture levels and soil chemicals typical of Leicestershire clay-heavy profiles.

Key Benefits Delivered:

1. **Technical Specification:** The system provided immediate protection against 90% of rainfall-induced erosion prior to vegetation.
2. **Performance Data:** Post-establishment, the reinforced turf can withstand flow velocities significantly higher than unreinforced grass, ensuring long-term slope stability.
3. **Technical Reliability:** The solution was designed in accordance with CIRIA 116 guidelines, ensuring the EnkaMat 7020 matrix provides robust surface protection throughout its 100-year design life.
4. **Project Efficiency:** The lightweight rolls are 3.85m wide and 100m long which meant the contractor could complete the installation 25% faster than smaller format alternatives.

Key Takeawy

Broadnook Garden Village demonstrates how Geosynthetics Ltd combines advanced material science with practical site application.

By specifying EnkaMat™ 7020, we provided a permanent, bio-engineering solution that balances high-load hydraulic performance with the aesthetic requirements of a modern green development.

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