



PROJECT CASE STUDY

Harbury Cutting: *Smart Guard* - Event-driven monitoring, for high-risk railway civil assets.

- Delivering real-time civil asset monitoring to enhance safety at Harbury Cutting.
- A resilient, low-intervention monitoring solution for proactive civil engineering risk management.

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How we helped our customer

Summary

Harbury Cutting is a known area of cutting instability, with a history of progressive slope deterioration and previous failure activity.

Following increased industry scrutiny of asset performance, and remote monitoring reliability, Network Rail required a resilient remote monitoring solution capable of operating effectively in dense vegetation and challenging environmental conditions. The solution also needed to deliver rapid event driven alerts to support faster operational response and improved asset safety.

DYWIDAG designed, delivered and installed their Smart Guard monitoring system across approximately 180 linear metres of cutting, providing near real-time movement detection, prioritised alerting and integrated visual verification, to support proactive earthworks risk management.

- **Location** Harbury, Warwickshire, UK
- **Client** Network Rail
- **Timeline** Installed 27-30th April 2026
- **Partner** Murphy
- **Product/ Service** Smart Guard monitoring system, comprising design and installation, technology stack of tilt sensors, remote cameras, onsite solar and battery power and link to *Infrastructure Intelligence* data visualisation and analysis cloud-based software (connected to Radar)

Project focus

Rapid, event-driven alerting: Any potential movement-triggered events provide immediate (within seconds) alerts, enabling rapid operational response and improved situational awareness.

Minimal asset disturbance:: Driven sensor posts and rope access installation avoided any excavation and preserved the in-situ ground conditions.

Resilience in challenging conditions: The system performs reliably even in dense vegetation cover, extreme weather events, and event sensor burial — addressing known failure modes of traditional systems.

Enhanced decision making: Real time alerting and clear and helpful imaging, supports faster engineering assessment and proactive risk management.

Full support: DYWIDAG provided a full team of engineers, rope access technicians and technology support to prepare the site, install power, the Smart Guard solution and remote connection to the Infrastructure Intelligence cloud- based platform, including full testing and handover to Network Rail



Case Study: Harbury



Solar panels powering Smart Guard system

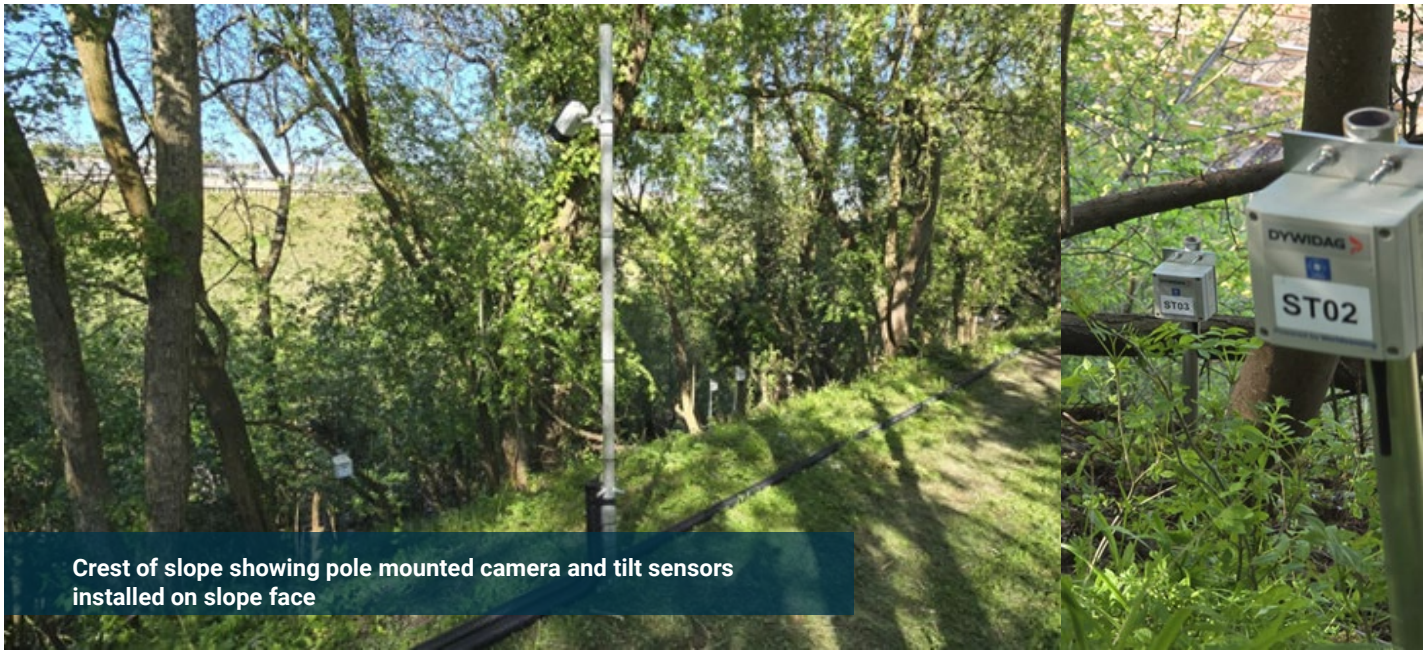
The Challenge

Network Rail requires greater confidence in its ability to rapidly detect and respond to potential movement events at Harbury Cutting, particularly following increased industry scrutiny around slope instability and asset resilience.

Traditional monitoring approaches were constrained by delayed reporting intervals, vegetation interference and reliability concerns during extreme weather conditions, creating the need for a faster and more resilient monitoring solution.

The project environment presented several operational and technical challenges. Dense vegetation created potential communications constraints, while the environment demanded minimal intervention during installation.

The system needed to maintain reliable operation during severe weather conditions and continue functioning even in scenarios involving partial sensor burial and/or ground disturbance.



Crest of slope showing pole mounted camera and tilt sensors installed on slope face

The Solution

The Smart Guard system was selected due to its event-detection capability and ultra-low alert latency, outperforming conventional tilt sensor systems that rely on periodic reporting intervals.

Key system features included:

- Event-triggered alerts: Immediate prioritised transmission to the right people and channels when pre-defined thresholds are exceeded.
- Low latency: Alerts delivered within approximately 2–3 seconds of any movement detection.
- LoRa communications: Long-range, vegetation-tolerant transmission suitable for the harshest environments.
- Resilient power design: Upgraded solar and battery configuration to ensure reliability.
- Camera integration: Scheduled 15-minute photographic capture with immediate image capture triggered by movement events.
- Night-time capability via infrared imaging.

The system was proven to continue transmitting even when sensors were partially buried or submerged — addressing failure modes identified in recent RAIB safety advice.

The Result

The installation delivered a scalable and resilient monitoring solution capable of supporting proactive civil asset risk management across the route.

Network Rail benefited from improved visibility of any cutting movement, faster operational response capability and reduced reliance on intrusive intervention methods. The solution also demonstrated strong resilience, even during adverse environmental conditions, supporting long-term asset safety and operational continuity.

- Provides real-time, prioritised alerts to Network Rail control rooms and engineering teams
- Operates effectively without ongoing vegetation management
- Maintains functionality in extreme environmental and ground conditions
- Minimises intervention and disturbance to the asset
- Supports proactive risk management and decision-making

The installation enhances Network Rail's ability to detect and respond quickly to instability events, improving the safety and resilience of the route.

"Following further earth movement on the on the upper slope of the Downside at Harbury Cutting, DYWIDAG assisted Murphy's with installing a new monitoring system to help manage and monitor the ongoing situation. Throughout the works, the professionalism, technical knowledge, and commitment shown by the team were outstanding.

A special thanks must go to Tony Morgani, Operations Director, whose leadership, expertise, and hands-on approach were evident from start to finish. Tony and his team worked with Murphy's to ensure that the installation was completed safely, efficiently, and to the highest standard.

Their dedication and understanding of the challenges involved gave us great confidence throughout the project."

- Matthew Boulton, Senior Site Manager, Murphy



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Want to know more?

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