



### Gediminas Castle Hill, Lithuania, update 2019



#### PROJECT SUMMARY

NAME: Landslide affecting Gediminas' Castle Hill

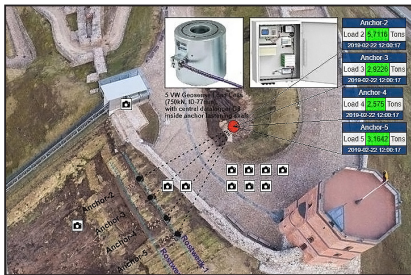
YEAR: 2017-19

CLIENT: National Museum of Lithuania

CONSULTANT: Geosense

INSTRUMENTATION SPECIALIST: GPS Partneris

INSTRUMENTATION SPECIALIST: Gintaris Maknavicius



Vista Data Vision - Load Cells



Prisms



Tilt Meters

#### OVERVIEW

Work continues to stabilise landslide damage affecting Gediminas' Castle Hill in Lithuania. The castle was built in the 14th Century. Historical sources mention the first catastrophic landslide occurred in 1396. More recently, a catastrophic slide occurred in 2017 following severe rainfall.

The site was closed to the public and work began to stabilise the area.

As well as controlling any movement in two retaining walls - a small stone one at the top and a main masonry wall at the bottom - the aim was also to activate an on-site landslide alert.

This is the first wireless, remote control monitoring system to be installed in Lithuania.

The site and the funicular have now reopened to visitors.

The project to stabilise the hill has so far cost the state 9 million euros.

#### MONITORING

Geotechnical monitoring began approximately two years ago following a series of severe landslides. Geosense sensors continue to provide online real-time monitoring and alarm alert.

So far, 23 wireless tilt meters have been installed, connected to the Wi-SOS 480 Gateway; 50 prisms are powered with four GeoMax Total Stations and five load cells measure the anchors' load, powered by a Geologger G8-Plus.

Future plans include increasing the number of prisms, installing piezometers for water level measurement in boreholes and drainage water wells and using inclinometers in a 40m borehole in the centre of the hill.

#### PRODUCTS USED

##### Wi-SOS 480 wireless Tilt Meters

Monitor existing retaining walls and landslide.

##### Wi-SOS 480 Gateway

GPRS Gateway, mains connected.

##### Monitoring Prisms

For measuring deflection.

##### Anchor Load Cells

Measuring load on anchors.

##### Geologger G8-Plus

Data logger purpose-designed for geotechnical applications

See following pages for a photographic timeline of progress at Gediminas' Tower



# Case Studies - Gediminas Castle Hill, Lithuania

## Pictorial Timeline



1. NW site 2016.01



2. NW site 2016.02



3. NW site 2016.05



4. NW site 2016.10



5. NW site 2016.10



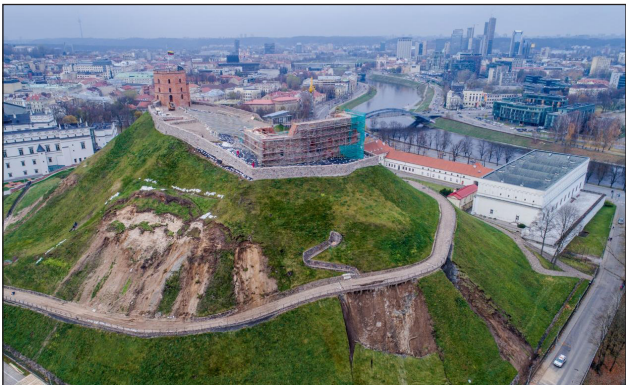
6. NW site 2016.10



7. NW site 2016.10



8. E site 2017



9. SE site 2017



10. SW site 2017



## Case Studies - Gediminas Castle Hill, Lithuania

### Pictorial Timeline



11. S site 2017



12. S site 2018



13. S site 2018



14. S site 2018



15. NW site 2018



16. NW site 2018



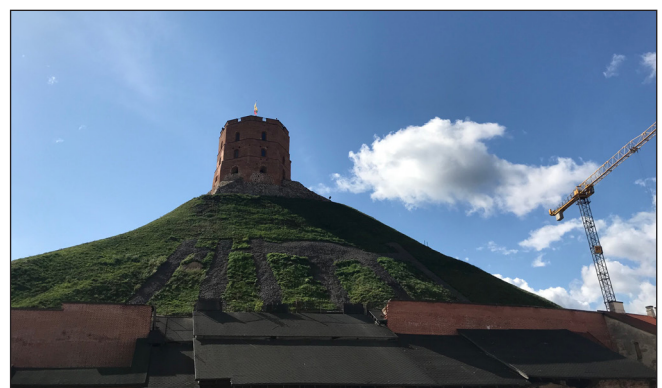
17. NW site 2018



18. NW site 2019



19. W site 2018



20. W site 2018

Pictures supplied by Gintaris Maknavicius , STC Geomonitoringas