

Big Goose Creek Slope Rehabilitation

Wyoming, United States

Disaster struck when an 80-ft high slope in Sheridan, WY, underwent a major slide, displacing more than 50,000 cubic yards of material.



The project

At the toe of the slope lies Big Goose Creek, a narrow waterway that runs through the town and is fed by a watershed from the nearby Bighorn Mountain range. Water is stored in several reservoirs above the city, serving as the primary potable water source. The reservoirs release water regularly, so spring meltwater draining into the watershed does not overload capacity. This release significantly raised the water level in the creek, weakening the bank and slope above it to the point of failure. Additional slope movement could block the creek, flooding low-lying areas and jeopardising a school located at the top of the slope.

A geotechnical evaluation identified two coal seams within the underlying bedrock. The reduced strength of these coal seams resulted in sliding surfaces, causing the landslide. Stability analysis indicated the slope was on the verge of failure and needed an immediate rehabilitation plan.

The challenge

- Immediate action was necessary to avoid additional slope failures that could block the narrow waterway.
- Working on top of an active landslide required heightened attention to safety by all parties.

The solution

Technical performance and construction feasibility led to the selection of a permanent remediation solution. Re-grading the slope was the most economical approach, but due to the school's proximity, additional features were needed to stabilise the remaining 40 ft of vertical rise.

Keller used several slope retention techniques, each implemented where it would be most effective, to reduce the remediation cost. Top-down construction was used, beginning with a 20-ft high, anchored soil nail wall at the top of the slope. Excavated material was placed downhill to create a stable working bench for an anchored soldier pile wall in the middle of the slope. An anchored gabion wall at the toe of the slope provided scour protection. Finally, a mechanically stabilised earth (MSE) wall was constructed to support a maintenance path along the slope. All walls received an architectural shotcrete face sculpted and stained by a specialty company. Stabilisation of the slope was completed without incident just 18 months after the initial site investigation.

Project facts

Owner(s)

City of Sheridan

Keller business unit(s)

Keller North America

Main contractor(s)

Keller

Solutions

Slope stabilisation

Markets

Institutional / public

Techniques

Soil nails

Gabions