

LANDSLIDE

DEFINITION – A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation reacting to the force of gravity. Landslides may be triggered by both natural and human-made changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction or erosion, earthquakes, and changes in groundwater levels. Mudflows, mudslides, rock falls, rockslides, and rock topples are all forms of a landslide. Areas that are generally prone to landslide hazards include previous landslide areas, the bases of steep slopes, the bases of drainage channels, developed hillsides, and areas recently burned by forest and brush fires. (Delano & Wilshusen, 2001).



MITIGATION ACTIONS FOR RESIDENTS

- ▶ **Restraining Structures** – Restraining structures may be designed and used to hold soil in place.
- ▶ **Debris-Flow Measures** – Debris-flow measures may include stabilization, energy dissipation, and flow control measures, all of which may reduce damage in-sloping areas.
- ▶ **Improve Soil Stability** –
 - **Grading** – Grading can be used to increase slope stability, depending on types of soils, height of fill or cut, and compaction.
 - **Vegetation Placement** – Various types of vegetation increase soil stability through root length and strength and by absorbing precipitation.
 - **Management Plans** – Management plans are aimed at ensuring long-term maintenance of vegetation appropriate for an area.



MITIGATION ACTIONS FOR MUNICIPALITIES

- ▶ **Adopt the York County Hazard Mitigation Plan** by resolution or develop and implement a municipal hazard mitigation plan. [York County Hazard Mitigation Plan](#)
- ▶ **Public Education and Outreach** – Educate residents regarding risk and impact of hazards, how to prepare and protect themselves and their property. Facilitate funding for mitigation measures and technical assistance programs that address measures that citizens can take.
- ▶ **Prepare an Emergency Operations Plan** which describe who will do what, as well as when, with what resources, and by what authority – before, during, and immediately after an emergency. [FEMA Guide for All Hazards Emergency Operations Planning Guide](#)
- ▶ **Coordination** – Develop pre-disaster Memorandums of Agreements or Memorandum of Understanding with adjacent jurisdictions. Build partnerships (neighborhoods, emergency

LANDSLIDE

management/first responders, businesses, utility service providers, and local government agencies to strengthen response and recovery.

- ▶ **Mapping** – Local governments, developers, and residents can make better decisions using maps. Soil types, slope percentage, drainage, or other critical factors are used to identify landslide prone areas.
- ▶ **Building Codes** – Building codes can set construction standards, including minimum foundation requirements, in landslide-prone areas.
- ▶ **Zoning Ordinances** – Zoning ordinances may be used to create buffers between structures and high-risk areas.
- ▶ **Slide-Prone Area Ordinance** – A special purpose ordinance for slide-prone areas may be used to limit fill or dumping, as well as address drainage and other landslide related problems.
- ▶ **Code Enforcement** – A strong community commitment to code enforcement is necessary to ensure compliance with building codes and zoning ordinances.
- ▶ **Drainage Control Regulations** – Drainage regulations are similar to storm water management regulations. By controlling drainage, a community can reduce the risk of landslides resulting from saturated soils.
- ▶ **Grading Ordinances** – Grading ordinances require developers and landowners to obtain permits prior to filling or regrading. Such ordinances may also provide specific design standards.
- ▶ **Hillside Development Ordinances** – Hillside development ordinances are special purpose ordinances that set specific standards for construction on hillsides.
- ▶ **Subdivision Ordinances** – Subdivision ordinances set guidelines on how land will be divided, the placement and size of roads, and the location of infrastructure. Such ordinances can also be used to regulate open space and buildable areas.
- ▶ **Geological Hazard Overlay Zone** – A geological hazard overlay zone requires a detailed geotechnical analysis prior to any construction activity. Used in association with building codes, this may reduce damage potential by providing clear information about risk.
- ▶ **Sanitary System Codes** – Sanitary system codes can reduce the effect of drainage on landslides by limiting the type and location of sanitary systems.
- ▶ **Open Space Designation** – Open space designations keep landslide prone areas undeveloped.
- ▶ **Relocation** – Structures may be moved to less hazardous locations.
- ▶ **Acquisition** – Land and structures may be purchased by and titled in the name of a local governing body that can remove structures and enforce permanent restrictions on development.

LANDSLIDE

- ▶ **Utility Location** – Placing utilities outside of landslide areas decreases the risk of service disruption.
- ▶ **Restrictive Covenants** – A legally binding agreement in a private development can be used to impose restrictions on land use.