

TECHNICAL CONTENT – PROPOSED STEEP SLOPE REGULATION

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DEFINITIONS

Administrator: The person appointed by the Macon County Department of Planning, Permitting and Development to determine the Category of slope and other slope related duties or a duly appointed designee of said Department.

Applicant: The person or entity, or the duly appointed agent thereof, financially responsible for the land disturbing activity.

Cut Slope: A slope exposed by excavating earth materials.

Design Professional: A Civil Engineer, Geotechnical Engineer, Land Surveyor, Architect, Landscape Architect, or Professional Geologist currently registered in the State of North Carolina.

Downslope Hazard Map: A map produced and published by the North Carolina Geological Survey, Division of Land Resources, Department of Environment and Natural Resources, and incorporated by reference herein that portrays areas of Macon County designated as high, moderate, or low hazard zones that could be potentially affected by shallow, translational slope movements (i.e., debris/earth slides and flows). These areas are likely to be in the path of slope movements, including areas significantly further downslope from where the slope movements originate.

Earth Movement: Any movement of the ground, such as landslide, subsidence, sinking, collapsing, mudflow, or rising or sinking of the ground.

Excavation: A land disturbing activity by the mechanical removal, placement, or other movement of earth material, including soil and rock.

Existing Grade: The natural grade of the site prior to any land disturbing activity.

Fill: A deposit of earth or other natural or manmade material placed by mechanical means.

Grading: Any alteration of the natural topography of the surface of the earth, including excavation, filling, cutting, and scraping.

Grading Envelope: The limits of disturbed ground, whether such disturbance is on contiguous or separated parts of the site.

Influence Zone: The total extent of land, either on site or off site that may be subjected to the effects of earth movement caused by the proposed land disturbing activities or construction activities on the subject property.

Land Disturbing Activity: Any artificial change to the surface of the earth that involves clearing of trees and other vegetation or alteration of the present topography by grading, excavation, or filling of land, including, but not limited to, road building and building construction. The term land disturbing activity does not include such activities as home gardening, home maintenance, home landscaping, home landscape maintenance, or firewood cutting for personal use.

LiDAR: Light Detecting And Ranging. An optical remote sensing technology that maps physical features such as the elevation of the land. The elevation data were provided by the North Carolina Floodplain Mapping Program in 2006.

Site Category: A classification system indicating the magnitude of the slope or the risk associated with downslope hazards, with Category 1 being the least steep and Category 3 being the steepest.

Site Plan: A scale drawing, prepared by the Applicant or his designee, showing the locations of proposed land disturbing activities, building construction and other requirements as listed herein.

Slope: A deviation of the earth's surface from a horizontal, level plane. The method for determining the degree of slope is specified herein.

Slope Movement Hazard Maps: Collectively, the Stability Index Map for Debris Flow – Debris Slide Hazard and the Downslope Hazard Map, both for Macon County, which are incorporated by reference herein.

Stability Index Map for Debris Flow – Debris Slide Hazard: A map, produced and published by the North Carolina Geological Survey and incorporated by reference herein that delineates for Macon County the predicted relative hazard rankings (high, moderate, and low) for the initiation of naturally occurring, shallow, translational slope movements (i.e., debris/earth slides and flows) in response to approximately 5-6 inches of rain in a 24 hour period.

Stormwater Management Plan: A scale drawing, prepared by the Applicant or his designee, showing features (such as berms, culverts, water breaks, etc.) intended to effectively manage stormwater runoff following construction. The stormwater management plan may be incorporated into the site plan.

Structurally Stabilized Slope: A modified slope retained by any of several approved structural methods, including but not limited to retaining walls, soil nails, and tie backs.

CATEGORY OF SITE DESIGNATED. Any site in Macon County upon which a land disturbing activity is proposed shall be placed in one of the following Categories. In cases where the site falls in more than one category, the more stringent requirements shall govern.

Category 1 Site – 0% to 30% slope

Category 2 Site – greater than 30% but less than or equal to 40% slope

Category 3 Site - greater than 40% slope or in a High or Moderate downslope hazard category on the Downslope Hazard Map or in a High or Moderate Relative Debris Flow/Slide Hazard category on the Stability Index Map.

Category 4 Site – not dependent on magnitude of slope. Category 4 sites are those sites that lie in a High or Moderate downslope hazard category on the Downslope Hazard Map.

SLOPE MEASUREMENT. Slope at various locations on a given site shall be determined using maps generated from the 2004 LiDAR digital elevation model for Macon County provided through the North Carolina Floodplain Mapping Program. Slope is derived from the above LiDAR data using the slope function in a geographic information system. The required map is the one at <http://64.85.190.132/steepslope/> which will be used to determine the slope for Category 1, 2, and 3 sites.

The Administrator shall determine the Site Category prior to the initiation of any land disturbing activity.

The procedure for determining the Site Category is:

1. The Applicant shall prepare or have prepared a site plan of the property. The Administrator may provide assistance in preparing the plan. The site plan shall show:
 - a. All features on the site plan drawn to scale with the scale indicated on the plan.
 - b. Contour lines with the maximum allowable contour interval being 5 feet.
 - c. Locations of proposed construction showing all buildings requiring a building permit, including attached decks and other attached appurtenances.
 - d. Location of proposed driveways and parking.
 - e. Limits of proposed land disturbing activity.
2. The Applicant shall submit the site plan to the Administrator at the Macon County Department of Planning, Permitting and Development.
3. The Administrator shall determine the Influence Zone for the proposed construction utilizing the Macon County GIS Mapping System and the Slope Movement Hazard

- Maps for areas not included on the site plan. The determination of the Influence Zone shall include, but not be limited to, the following:
- a. The grading envelope together with a minimum additional area defined by a line located 35 feet beyond the grading envelope.
 - b. Assessment of the hazard levels shown on the Slope Movement Hazard Maps of Macon County. *Specifics required.*
 - c. Existing topographic changes not shown on current versions of the GIS mapping or the Slope Movement Hazard Maps.
4. Utilizing the submitted site plan and the Influence Zone, the Administrator shall determine the Site Category using the LiDAR slope map, the Downslope Hazard Map, the Stability Index Map, and the following guidelines.
- a. If all of the proposed disturbed area and Influence Zone is in the area designated as having a slope less than or equal to 30% and none of it is in a High or Moderate downslope hazard category on the Downslope Hazard Map, then the site shall be classed as Category 1.
 - b. If any location in the proposed disturbed area **or** Influence Zone has a slope greater than 30% but less than 40% and none of it is in a High or Moderate downslope hazard category on the Downslope Hazard Map, then the site shall be classed as Category 2.
 - c. If any location in the proposed disturbed area **or** Influence Zone has a slope greater than 40% or if the site is in a High or Moderate downslope hazard category on the Downslope Hazard Map or in a High or Moderate Relative Debris Flow/Slide Hazard category on the Stability Index Map then the site shall be classed as Category 3.
 - d. If all of the proposed disturbed area and Influence Zone is in the area designated as having a slope less than or equal to 30% **and** if the site is in a High or Moderate downslope hazard category on the Downslope Hazard Map, then the site shall be classified as Category 4.

STANDARDS. The following requirements and construction standards apply to the Site Categories.

GENERAL REQUIREMENTS FOR ALL SITE CATEGORIES.

1. The area to be excavated or upon which fill material is to be placed shall be stripped and grubbed, and all organic material shall be removed from that area.
2. All natural watercourses and lakes shall be provided with a buffer that complies with the requirements of the Macon County Soil Erosion and Sediment Control Ordinance.

3. Upon completion of construction, permanent ground cover shall be provided that complies with the requirements of the Macon County Soil Erosion and Sediment Control Ordinance.
4. Unless a permit from the N.C. Department of Environment and Natural Resources Division of Solid Waste Management to operate a landfill is on file for the site, acceptable fill material shall be free of organic or other degradable materials, masonry, concrete and brick in sizes exceeding 12 inches, and any materials which would cause the site to be regulated as a landfill by the State of North Carolina. Fill materials must be free of any toxic or hazardous material. Fill materials shall be suitable for compaction to the standards contained herein. (Note: This language, except for the last sentence, is identical to that in the Macon County Soil Erosion and Sedimentation Control Ordinance.)
5. The site shall not contain any graded or structurally stabilized slope in excess of 30 feet in vertical height.
6. For cut slopes between 8 feet and 30 feet in vertical height, the maximum allowable slope is 1.0 vertical to 1.5 horizontal (1.5:1).
7. For fill slopes between 5 feet and 30 feet in vertical height, the maximum allowable slope is 1.0 vertical to 2.0 horizontal (2.0:1).
8. Fill material must be placed in lifts not greater than 8 inches in thickness, and compacted to a minimum of 92% Standard Proctor Density. The compaction may be verified at the discretion of the Administrator.
9. A bench with a minimum width of 5 feet must be constructed at the toe of any fill greater than 5 feet in vertical height. Fills greater than 10 feet in vertical height must have a bench at the toe of the fill with a minimum width of 10 feet, and an additional 5 foot wide bench for each 5 feet in vertical height.

CATEGORY 1 SITES.

1. Category 1 sites generally pose the least risk of earth movement as a result of land disturbing activities or building construction.
2. The General Requirements for all Categories shall be met.
3. No additional action is required under this Ordinance.

CATEGORY 2 SITES.

1. Category 2 sites have moderately steep slopes and may pose significant risk of earth movement as a result of land disturbing activities or building construction.
2. In this Category, the Administrator shall either approve the project as submitted or require that plans and specifications be prepared by a Design Professional.
3. If approval is granted, the Administrator shall provide regulatory oversight.
4. In order for the Administrator to grant approval of the project as submitted, all of the following conditions must be met:

- a. The Applicant shall submit a site plan drawn to scale showing areas to be graded, locations of buildings and driveways, heights of cuts, fills, and slopes, and a post construction stormwater management plan.
 - b. The site, including the Influence Zone, shall not lie in an area mapped as High or Moderate on the Slope Stability Index Map of Macon County.
 - c. The site, including the Influence Zone, shall not lie in the High or Moderate categories as shown on the Downslope Hazard Map.
5. If all of the above conditions are **not** met, the Applicant shall have plans and specifications prepared by a Design Professional.
 6. The Design Professional shall present proof of insurance to the Administrator. The minimum requirement is a Professional Liability policy with a minimum coverage limit of \$1,000,000.00 per occurrence.
 7. The plans and specifications prepared by the Design Professional shall contain, at a minimum, the following content. The Design Professional shall use his/her best judgment to determine if additional information is to be presented.
 - a. The plans, drawn to a scale sufficient to portray the proposed land disturbing activity and proposed construction, shall contain:
 - i. A topographic map of the disturbed area and the Influence Zone. The maximum allowable contour interval for the map shall be 5 feet.
 - ii. The location of the proposed buildings, driveways, and parking areas, together with other proposed hardscape and landscape features such as retaining walls, graded slopes, and ponds.
 - iii. Sufficient detail to indicate construction methods for earth retaining structures.
 - iv. Sufficient detail to indicate the height and slope of cut and fill slopes.
 - b. The specifications, which may be in the form of notes on the plans, shall contain:
 - i. Requirements for fill placement, whether for fill slope construction, building pad construction, or general site modification.
 - ii. Cut and fill heights and slopes.
 - iii. Benching and Soil compaction requirements.
 - iv. Requirements for cut slopes.
 8. Upon completion of the land disturbing activities or at such other time as the Design Professional deems appropriate, he/she shall submit a Certification to the Administrator. The Certification shall contain, at a minimum, the following:
 - i. A statement that the Design Professional has visited the site to perform a final inspection following substantial completion.
 - ii. A statement that the completed project complies with the project plans and specifications. If it does not and the Design Professional

chooses to issue the certification, he/she shall note the deviations from the plans and specifications.

- iii. The Design Professional's North Carolina professional stamp with date and signature affixed to the Certification.

CATEGORY 3 SITES.

1. Category 3 sites have the steepest slopes and pose the greatest risk of earth movement as a result of land disturbing activities or building construction. As a result, these sites require the highest level of planning and the greatest degree of skill in the execution of the proposed activities.
2. The Applicant shall retain the services of a Design Professional to prepare plans, specifications, and a written report for the proposed land disturbance and site development activities on Category 3 sites.
3. The Design Professional shall present proof of insurance to the Administrator. The minimum requirement is a Professional Liability policy with a minimum coverage limit of \$1,000,000.00 per occurrence.
4. The plans, specifications, and written report shall contain, at a minimum, the following content. The Design Professional shall use his/her best judgment to determine if additional information is to be presented.
 - a. The plans, drawn to a scale sufficient to portray the proposed land disturbing activity and proposed construction, shall contain at a minimum:
 - i. A topographic map of the disturbed area and the Influence Zone. The maximum allowable contour interval for the map shall be 5 feet.
 - ii. The location of the proposed buildings, driveways, and parking areas, together with other proposed hardscape features such as retaining walls, graded slopes, and ponds.
 - iii. Sufficient detail to indicate construction methods for earth retaining structures.
 - iv. Sufficient detail to indicate the height and slope of cut and fill slopes.
 - v. Setbacks from perennial and intermittent streams and swales which may have a higher risk for debris flow.
 - b. The specifications, which may be in the form of notes on the plans, shall contain at a minimum:
 - i. Requirements for fill placement, whether for fill slope construction, building pad construction, or general site modification.
 - ii. Cut and fill heights and slopes.
 - iii. Soil compaction requirements.
 - iv. Requirements for cut slopes.
 - c. The report shall contain at a minimum:

- i. A certification by the Design Professional that he/she has visited the site to visually observe the topographic features prior to initiation of any land disturbing activity.
 - ii. An assessment of risks to public safety, either on the site or off the site.
 - iii. An assessment of environmental impacts, such as the potential for sedimentation of streams.
 - iv. An assessment of potential negative impacts on adjacent properties.
 - v. A classification of the soils on the site.
 - vi. An assessment of drainage patterns in the post-construction configuration.
 - vii. A statement of the percentage of impervious surfaces resulting from the proposed construction on the entire site.
- d. Upon completion of the land disturbing activities or at such other time as the Design Professional deems appropriate, a certification shall be submitted to the Administrator. The Certification shall contain, at a minimum, the following:
- i. A statement that the Design Professional has visited the site to perform a final inspection following substantial completion.
 - ii. A statement that the completed project complies with the project plans and specifications. If it does not and the Design Professional chooses to issue the certification, he/she shall note the deviations from the plans and specifications in the Certification.
 - iii. The Design Professional's North Carolina professional stamp with date and signature shall be affixed to the Certification.

CATEGORY 4 SITES.

1. Category 4 sites lie in an area mapped as High or Moderate on the Downslope Hazard Map. These sites, even though they may have minimal or even negligible slopes, may be in the path of hazardous debris flows.
2. The Applicant shall retain the services of a Design Professional to prepare plans and specifications for the proposed land disturbance and site development activities on Category 4 sites.
3. The Design Professional shall present proof of insurance to the Administrator. The minimum requirement is a Professional Liability policy with a minimum coverage limit of \$1,000,000.00 per occurrence.
4. The plans and specifications shall contain, at a minimum, a detailed site plan. The Design Professional shall use his/her best effort to locate the site improvements on a part of the site that poses the least risk of hazards from debris flows.
5. The Design Professional shall use his/her best judgment to determine if additional information is to be presented in the plans and specifications.