Mountains and Mud
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EROSION CONTROL PLANNING
CONSIDERATIONS FOR
WESTERN NC

Design Considerations
- Steeper Cut and Fill Slopes
- Faster Water Run-off Velocities
- Shorter Growing Season
- More Dirt Moving
- Unique Stream Classifications such as Trout, High Quality Waters, and Outstanding Resource Waters
Smart man finds solution to the problem.....
Wise man avoids the problem.

AVOID THE PROBLEM

“Mud Does Not Wait”
– Earl Davis, Guildford County
Ghost Town-Rich Cove
Retaining Wall Failure – Debris Flow

- 3,000 ft-long track
- 25,000 cubic yards of debris
- 3 homes damaged
- NCDOT Road damaged & blocked
- ~$1.1+ million EWP grant to stabilize slope at Ghost Town

Snow: ~8” Jan 29-30
Rain: ~1.2” Feb.

It takes less rainfall to trigger a debris flow on a modified slope (with evidence of prior instability), than on an unmodified slope
Chocolate Drop Mountain, Polk County

$116,000 assessed

What now coach??
Buncombe County Embankment Failure
July 4-6, 2013 Storm
House Condemned

Jackson County
Mtn. Heritage Embankment Failure-
Debris Flow II 2013_01_16
Approximate Outline of January 16, 2013
Cut Slope Failure
Debris Flow

Approximate Outline of Pre-existing
Debris Deposits

Haywood County January 13-17, 2013 storm. Cut slope
failure – debris flow damages home located in an area of
past landslide activity.

Queen’s Gap
Don’t Forget THE Principles

- Fit development to the site.
- Grade to minimize cut and fill slopes.
- Preserve natural buffer areas.
- Limit the time that bare soil is exposed.

- That said..................

Steeper Cut and Fill Slopes

- Slope Design and Construction
- Runoff Protection
- Stabilization and Maintenance
Slope Design and Construction

No more than 2:1 and limit length of slope

- Geotechnical Design/Retaining Walls if Steeper
- Slope Breaks or Benches (for 2:1 every 20 Feet)
- Existing Topography (LIDAR, On the ground surveys)
- Existing Site Conditions and Any Geologic Hazards

Buffers

- Adequate Buffers to Other Property and Streams
- No Fill Adjacent to Channel Banks

Construction

- Topsoil Reuse and Roughened Surface
- Clean Fill - No Debris, Stumps, Rocks, Logs
- Layered Fill <= 9 inches layers and compacted
- All Seeps or Springs Handled in Construction – No Water in Fill Slopes
- Sediment Controls before Slope Construction.
- Access to Sediment Basins/NOT Across Fill or Cut Slopes

Buncombe County

Watauga County

Henderson County

Macon County

Geohazards and Landslide Mapping Website

- Landslide Point location
- Recent Debris Flow Pathways
- Slope Movement Deposits
- 2006 Orthophoto
- Parcels
Steep Slope Ordinances

- Buncombe County
  - City of Asheville
- Haywood County
- Jackson County
- Town of Boone
- Polk County Considering?
- Henderson County Considering?

Runoff Protection

- **Diversions**
  - No Water on Cut and Fill Slopes
  - Liners, Check Dams, Riprap, Concrete
  - Convey to Slope Drains

- **Slope Drains**
  - Anchors - Every 10 Feet
  - Proper Backfill Around and Under the Pipe
  - Watertight Connections
  - Adequate Inlet Protection with Seal/Outlet Protection

- **Stormwater Drains**
  - Avoid in Fill Slopes.
  - Watertight Connectors and Cradles
  - Avoid Cantilevered Outlet

- **Outlet Protection**
  - No Level Spreaders
  - Large and Long (44 plus feet) Riprap Aprons
Stabilization and Maintenance

- October to April – Mat immediately!
- Test soil – Amendments/Lime is cheaper than fertilizer.
- Next Spring – Top dress with fertilizer.
- Rye Grain NOT Rye Grass.
- Prep soil (Can’t hydroseed a brick!)
  - Roughen/loosen top layer/seed and mulch immediately.

Stabilization and Maintenance

- Sediment Basin/Trap Access NOT across slope.
Other Considerations

- Silt fence inadequate below long, steep slopes
  - Super Silt Fence vs. Ordinary Silt Fence

<table>
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<tr>
<th>Slope</th>
<th>Super Silt Fence (ft)</th>
<th>Regular Silt Fence (ft)</th>
<th>Maximum Area (ft²)</th>
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<tr>
<td>&lt; 2 %</td>
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<td>100</td>
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<tr>
<td>10 to 20 %</td>
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<tr>
<td>30%</td>
<td>100</td>
<td>15</td>
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<tr>
<td>40%</td>
<td>75</td>
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<tr>
<td>50%</td>
<td>50</td>
<td>15</td>
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</table>

(1) Slope length may not be increased by use of multiple rows of Super Silt Fence.


Other Considerations

- Geothermal Well Drilling
  - Sediment basins/traps have to be sized accordingly
  - Potentially large amounts of discharge
  - Measures in place during test well drilling

- Construction and E&SC Phasing
  - Perimeter measures prior to any disturbance
  - Stormwater system NOT available immediately
  - Stormwater system NOT for conveying sediment
  - Site stabilized before conversion of sediment basins to stormwater systems
Moving Dirt

- If moving dirt off-site (waste) or on-site (borrow):
  - All borrow/waste sites need to have an approved erosion control plan or be regulated as a mining operation.

(15A NCAC .04B .0110)

You might be MINING if

- More than one off-site location for waste; or
- Greater than 5 acres; or
- More than one year duration; or
- Borrow/waste site doesn't have an approved erosion control plan; or
- Blasting, removing materials from river, off-site waste on affected land; surface disposal of groundwater off-site; or
- In violation of local ordinances

(The Mining Act of 1971 – Chapter 74, Article 7, 74-49. Definitions – (7)(d) and (f))
Special Water Classifications/Buffers

- Trout Buffers
- High Quality Waters
- Outstanding Resource Waters
- WS-I thru IV
- Catawba/Tar Pamlico/Neuse Buffers

Trout Buffers

Local Programs have the authority and the responsibility for trout buffers.

Trout buffer variances only issued by NCDENR/DEMLR – Ashley Rodgers, NC Sedimentation Specialist.
Just Because You Don’t See Trout...Always Check the DWR Classification

- 25 Feet from Top of Bank – Stay out of it!
- Can disturb up to 10% linear footage owned, not to exceed 100 feet in any 1000 linear feet.
- If plans to disturb more, need a variance from DEMLR (Ashley Rodger) BEFORE you can issue an approval for the E&SC plan.
- Call Ashley Rodgers at (919)707-9215 for details.

High Quality Water (HQW)
(15A NCAC .04B .0124)

- 20 acres disturbance limit at any one time on the tract
- Control measures designed to a 25 year storm
- Within one mile and draining to HQW (one acre or more) – Need State Stormwater Permit with minimum buffer of 30 feet setbacks (call LQS Regional Office and/or Bradley Bennett – SW – (919)807-6378)
Outstanding Resource Waters (ORW)

- Draining to ORW (one acre or more) – Need State Stormwater Permit with minimum buffer of 30 feet. (call LQS Regional Office and/or Bradley Bennett–SW – (919)807-6378)

Other Buffer Rules (15A NCAC .02B .0243)

- Call Regional Office of Division of Water Resources.
Questions?

- Laura Herbert
- Laura.herbert@ncdenr.gov
- (828)296-4500
- Asheville Regional Office, LQS
- 2090 US Highway 70
- Swannanoa, NC 28778

Resources

- Water Classifications:  
  - [http://portal.ncdenr.org/web/wq/ps/csu/classifications](http://portal.ncdenr.org/web/wq/ps/csu/classifications)
- North Carolina Design Manual:  
  - [http://portal.ncdenr.org/web/lr/publications](http://portal.ncdenr.org/web/lr/publications)
- Geohazards and Landslide Mapping:  
  - [http://portal.ncdenr.org/web/lr/landslides-information](http://portal.ncdenr.org/web/lr/landslides-information)
- NC Floodplain Mapping  
- Pennsylvania Design Manual  