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Erosion and Sediment Control Basic Course

Module 7

The Plan Review Process



7a.

Basic Plan Reading Skills

READING CONTOUR LINES

- Shown as two-dimensional lines on a topographic map - the scaled distance between them is exactly the same as in the field.
- Line that passes through points having the same elevation
- Contour intervals can range from 1 feet to 100 feet

dashed lines

Existing contours

Proposed contours

Solid lines

READING CONTOUR LINES

Contour lines indicate the steepness of the terrain

- The closer the lines are together, the steeper the terrain.
- Further apart means less steep.

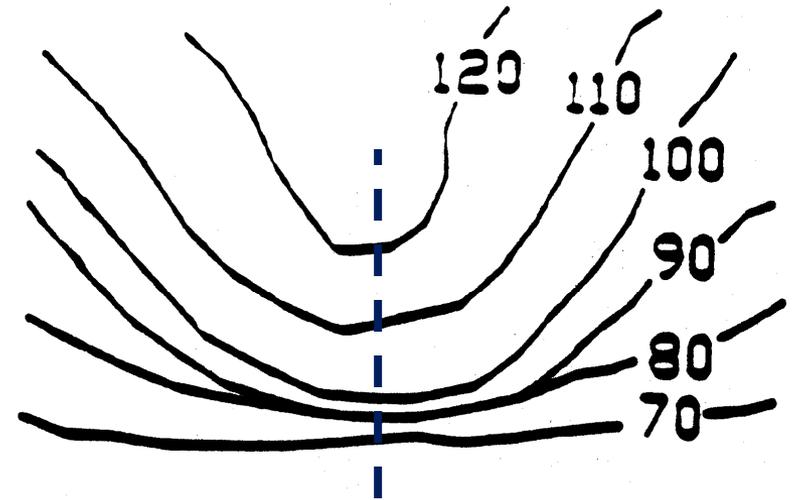
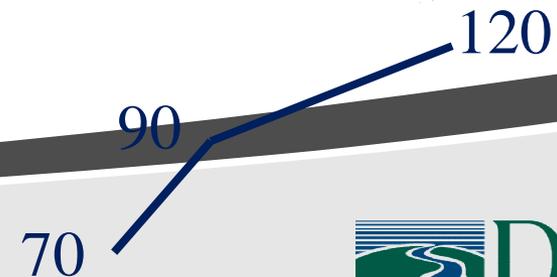
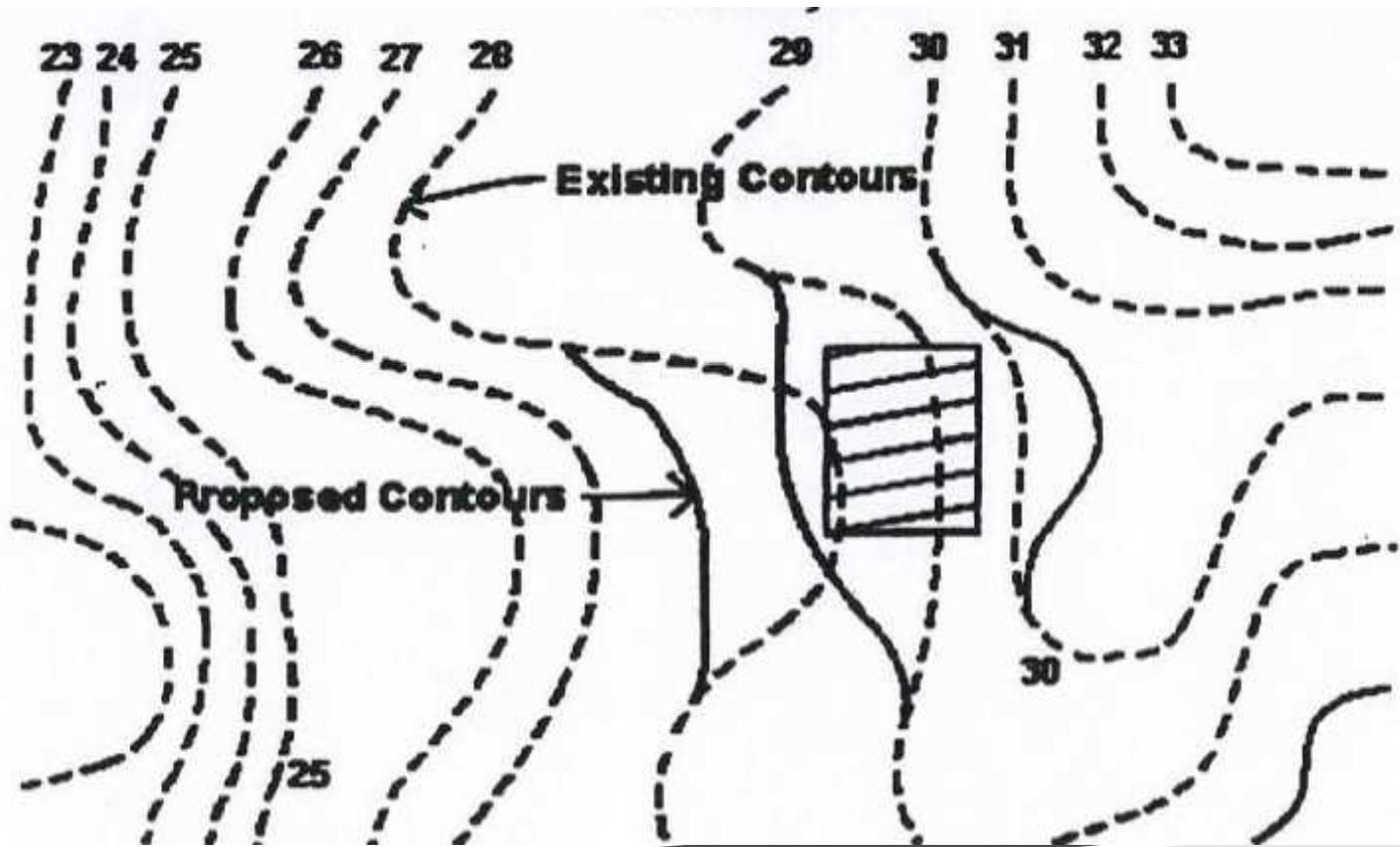


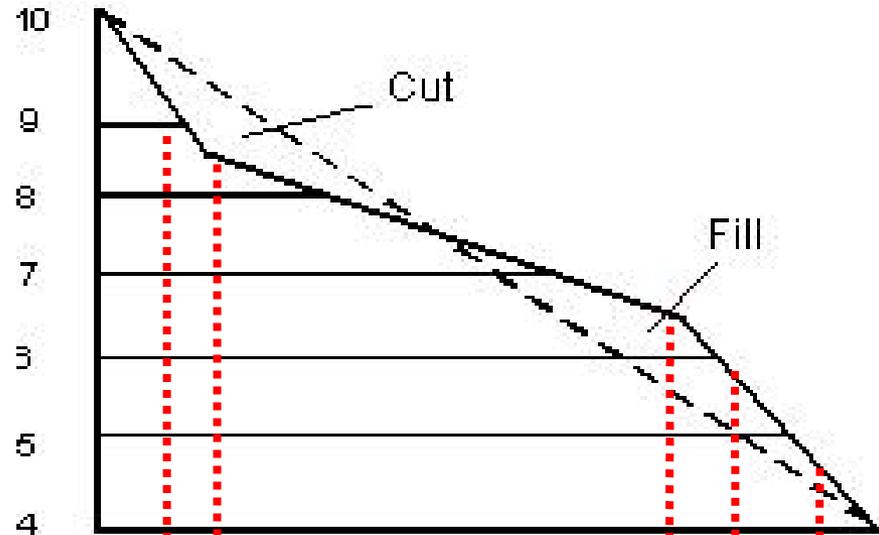
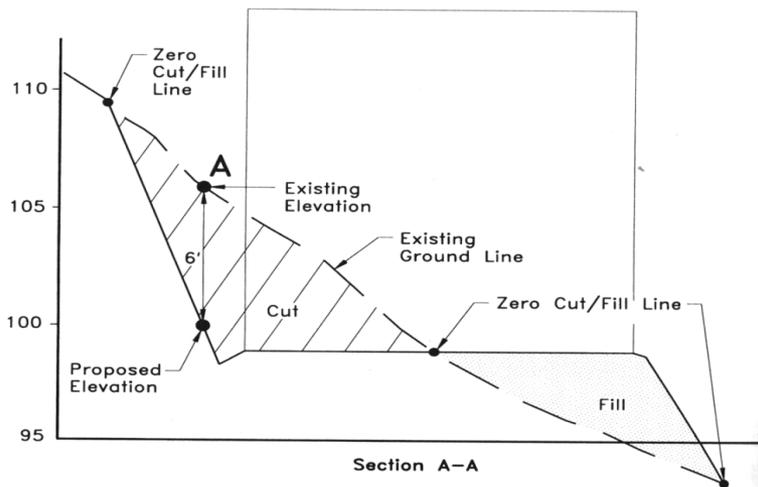
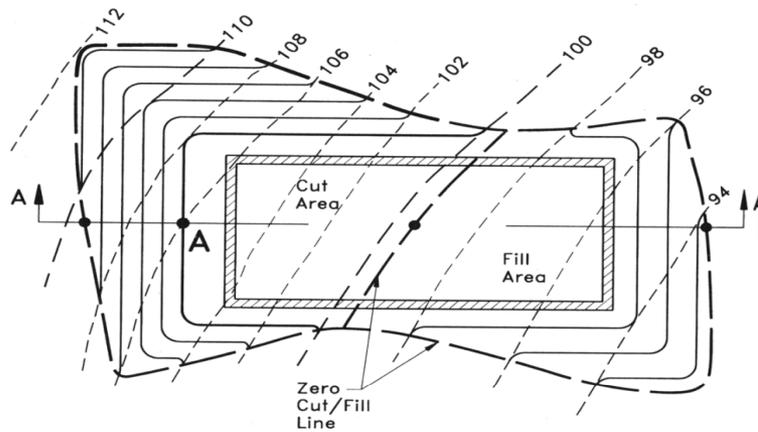
Figure A



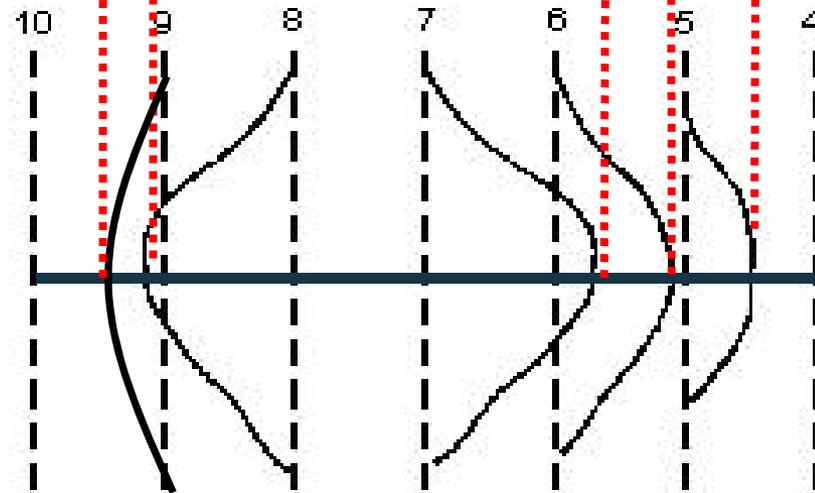
Cut & Fill Slopes



Cut & Fill Slopes



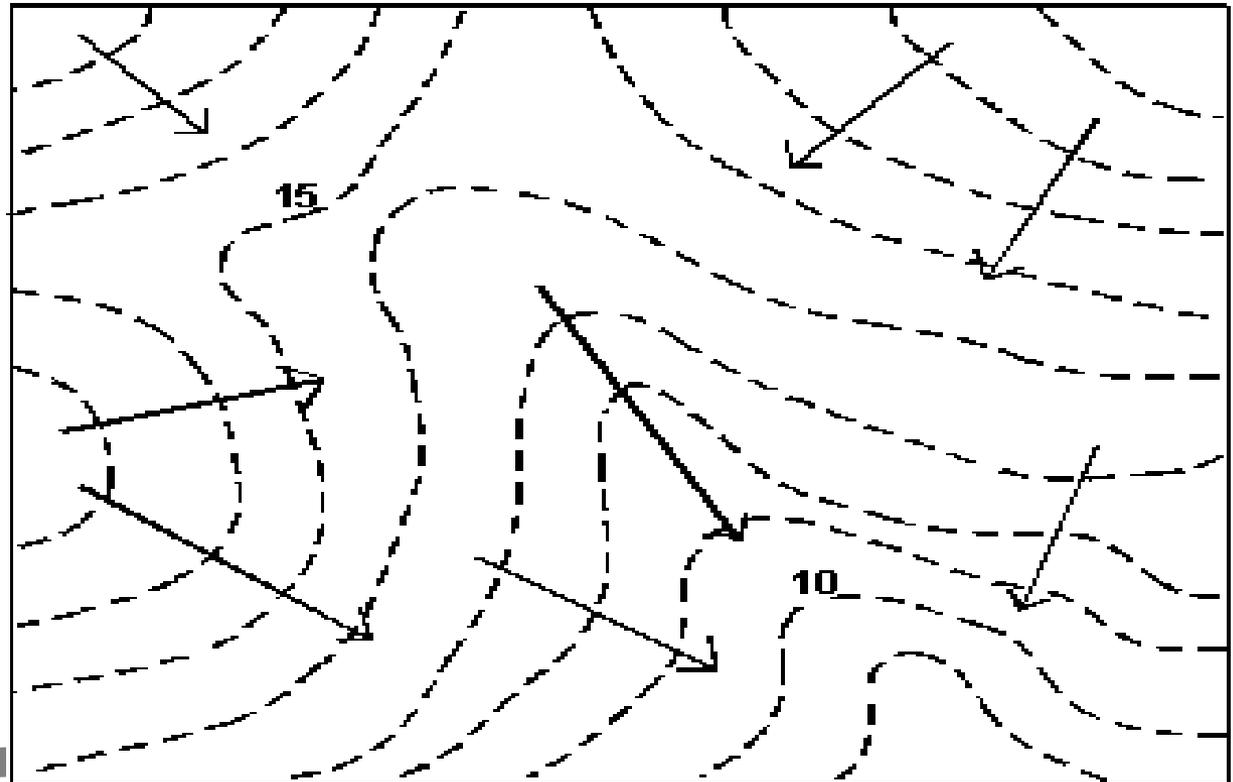
Section View



Plan View

Reading Contours

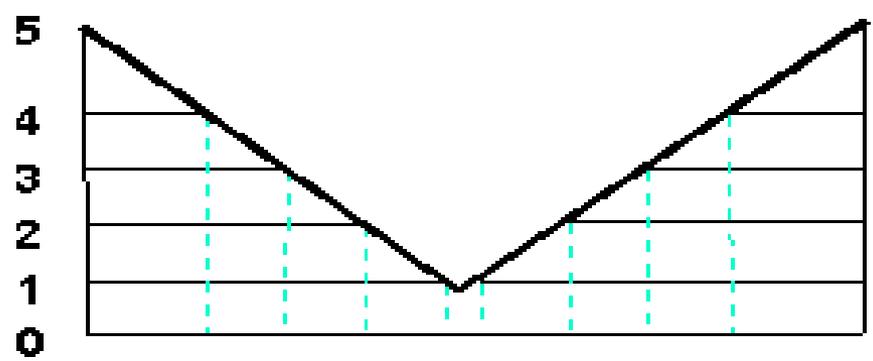
- Water always flows perpendicular to contour lines.



Contour Video

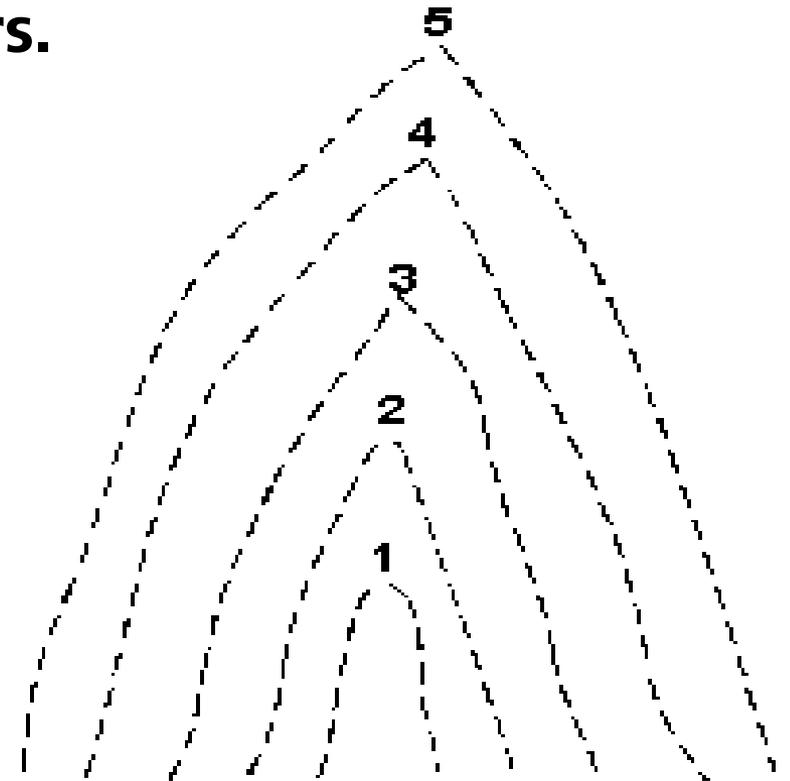


Valley or Swale



Represented by contours which point toward the higher numbers.

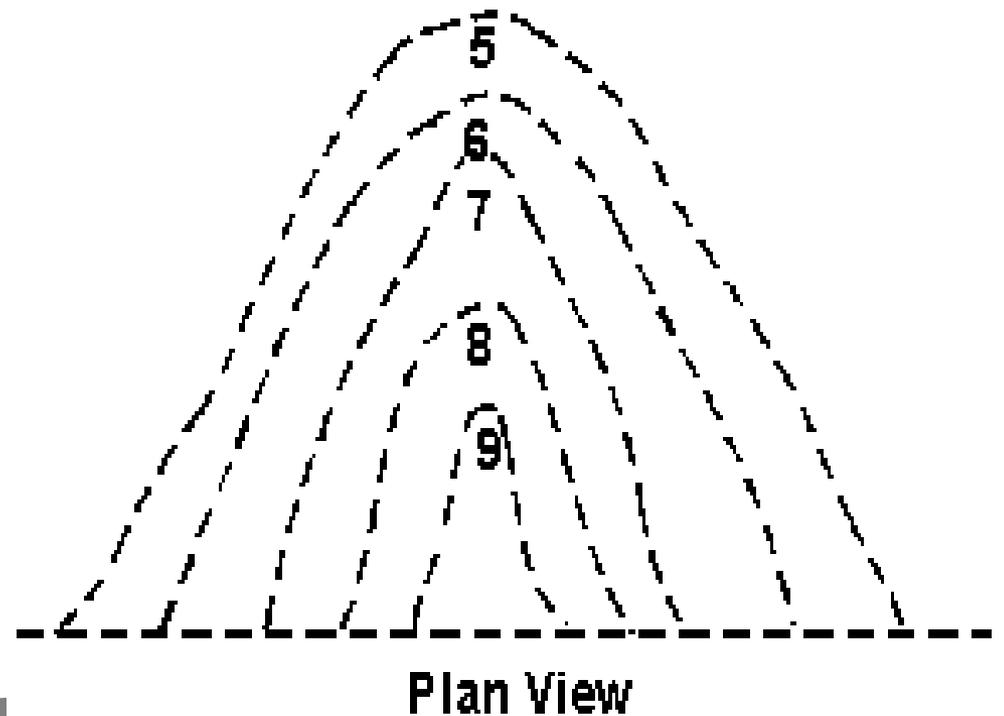
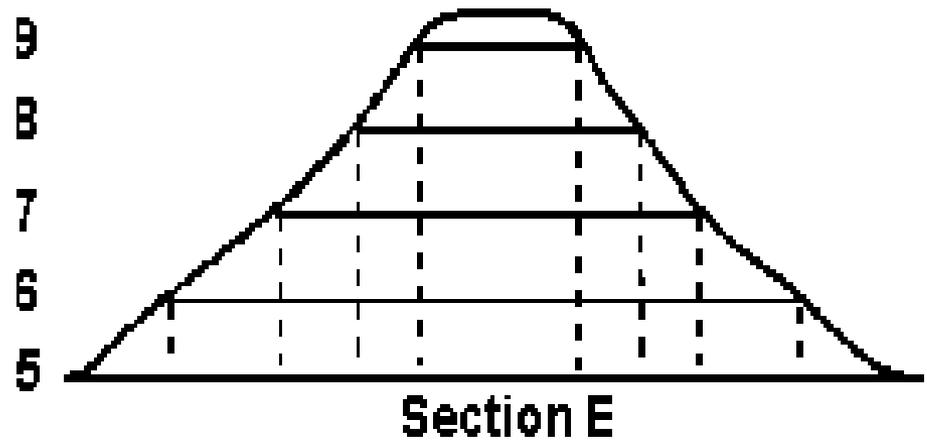
Inverted V – points to higher numbers.



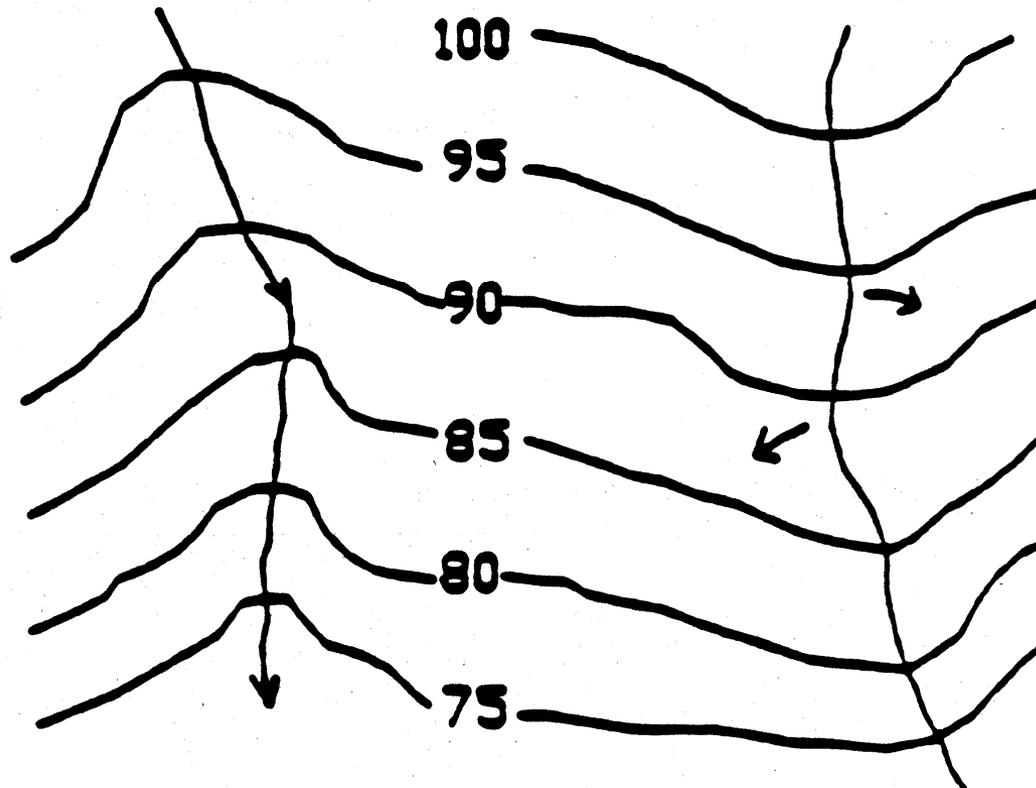
Plan View

Ridge

Similar to a valley, but represented by contours which point toward the lower numbers.

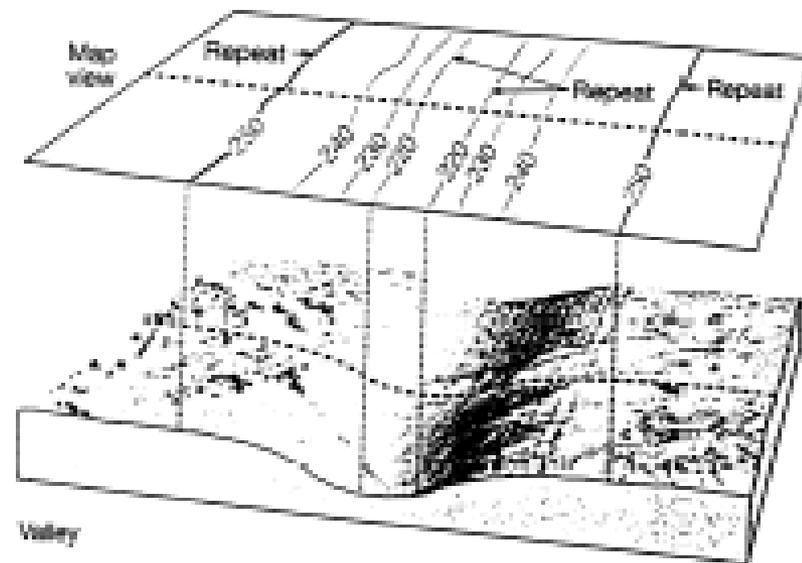
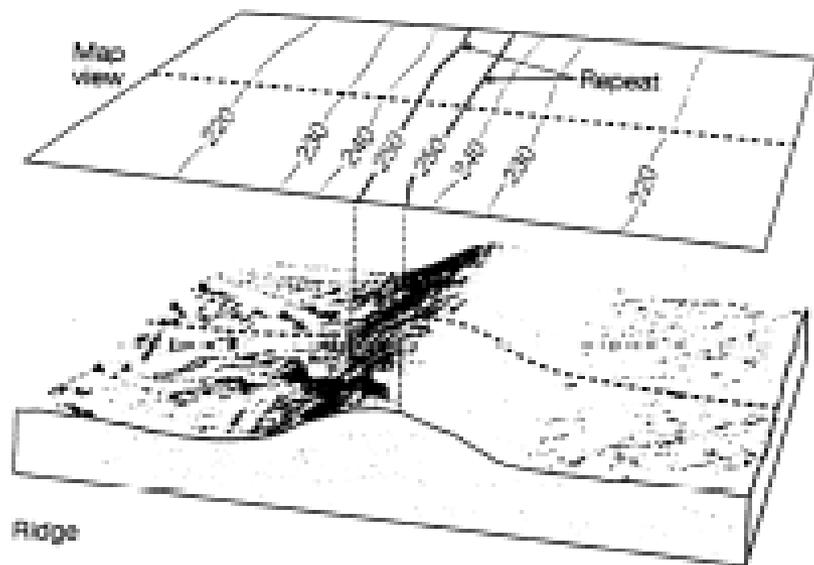


Valley or Ridge?

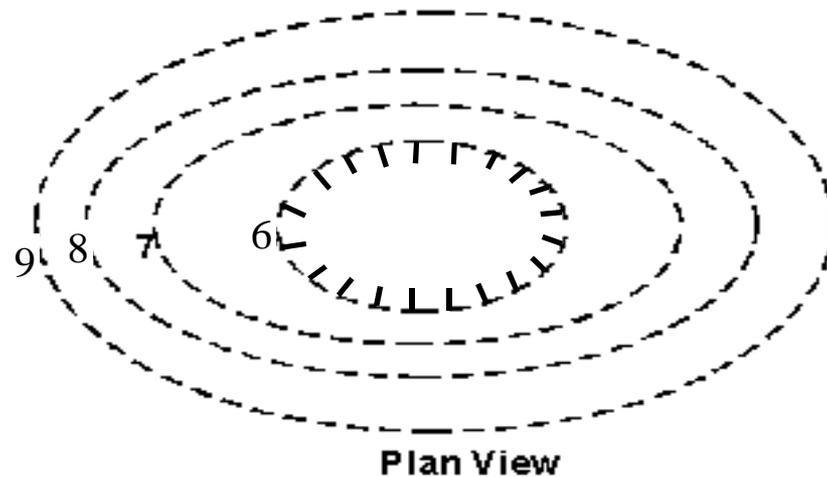
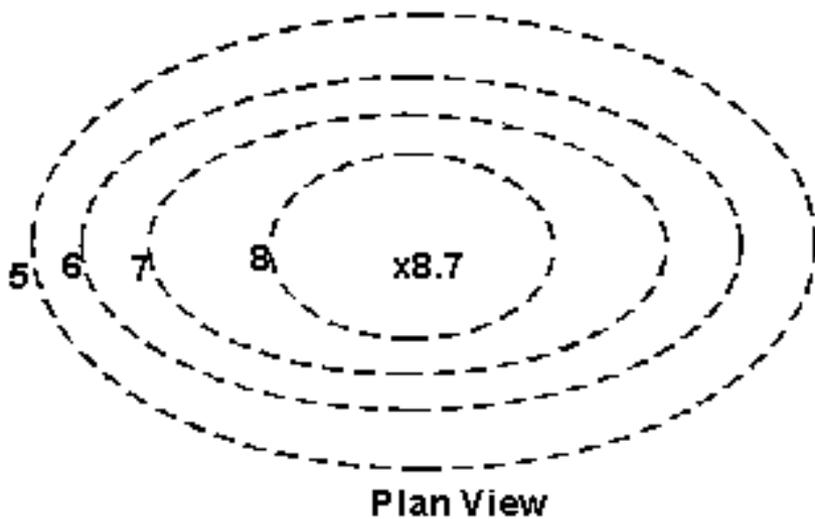
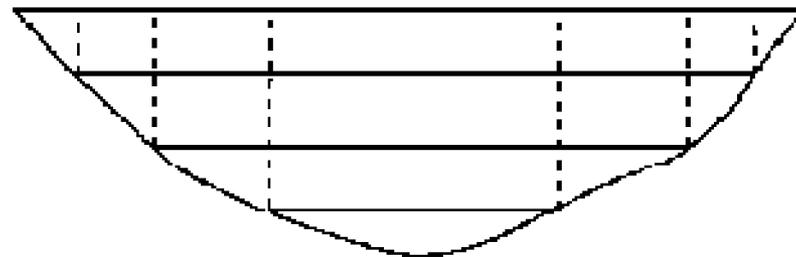
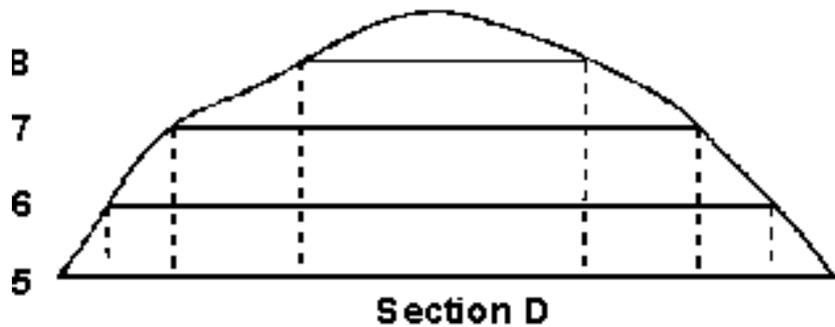


Ridges and Valleys

- Adjacent contours with the same elevation.
- Repeating Contours



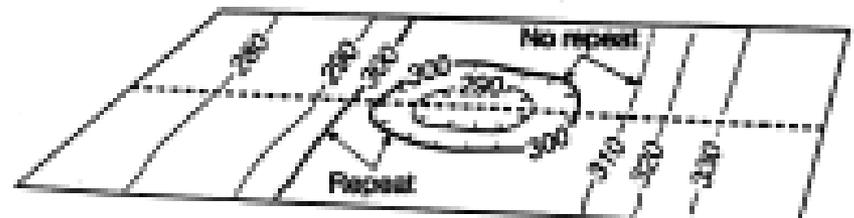
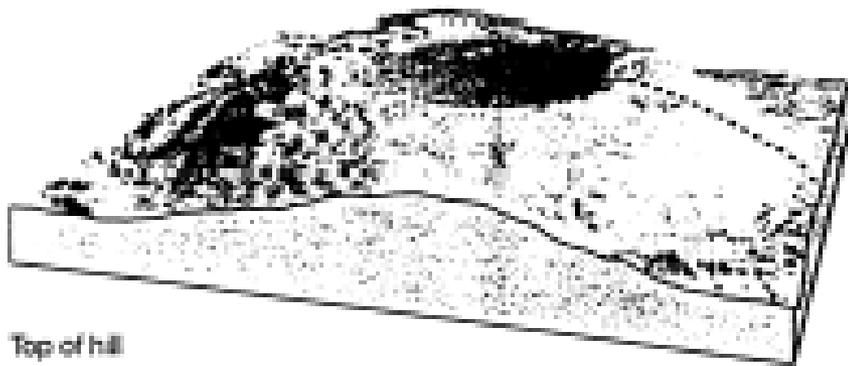
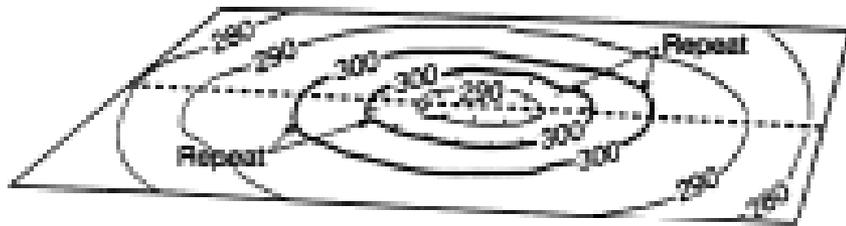
Summit and Depression



Karst



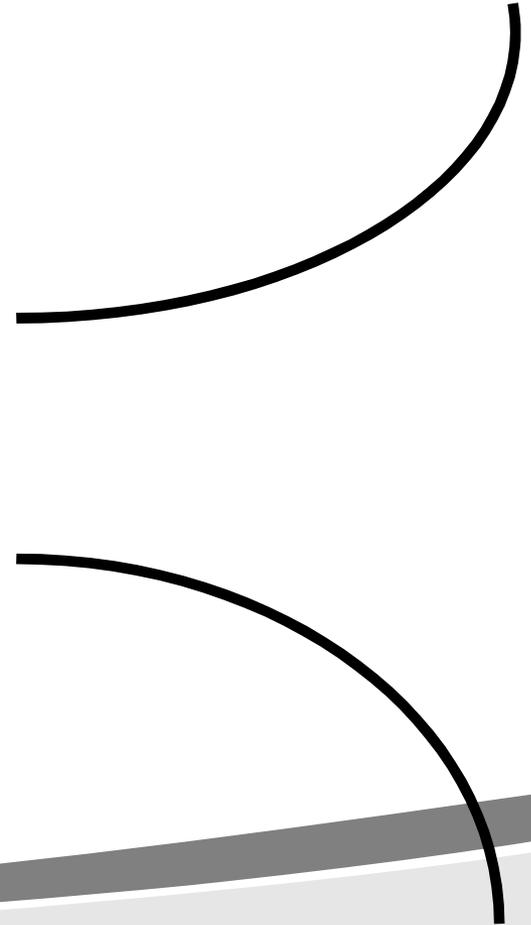
Depression





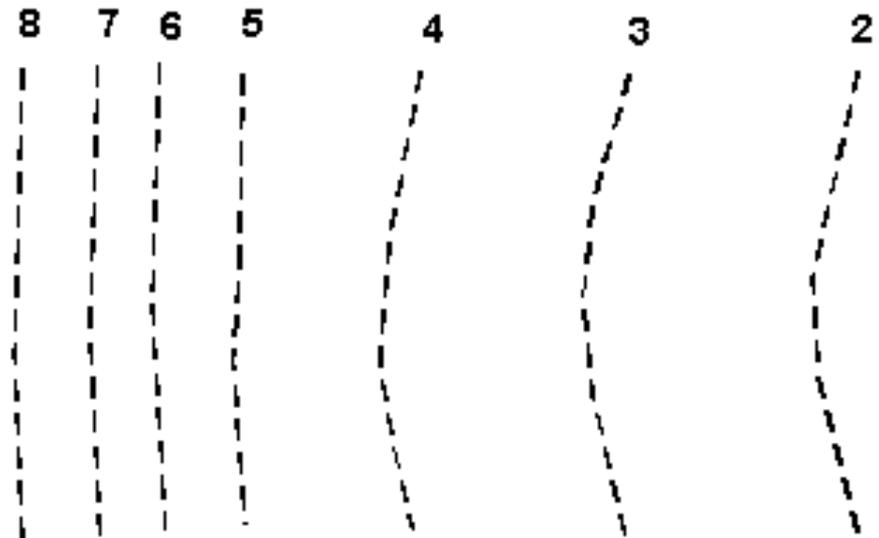
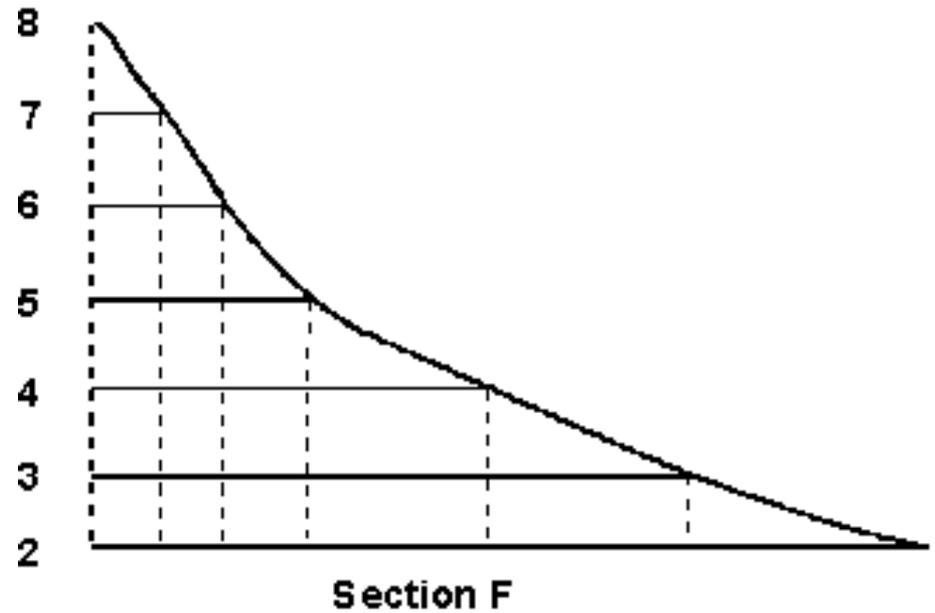
Slope Shapes

- **Concave Slope - parallel contours spaced farther apart at the bottom and closer together at the top of the slope.**
- **Convex Slope - parallel contours spaced closer together at the bottom and farther apart at the top of the slope.**



Concave slope

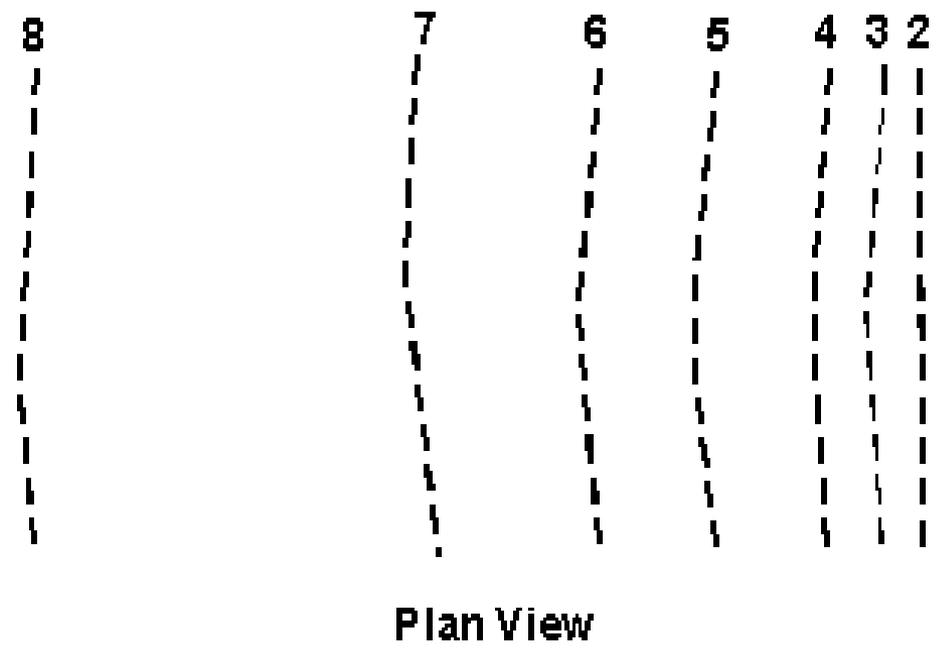
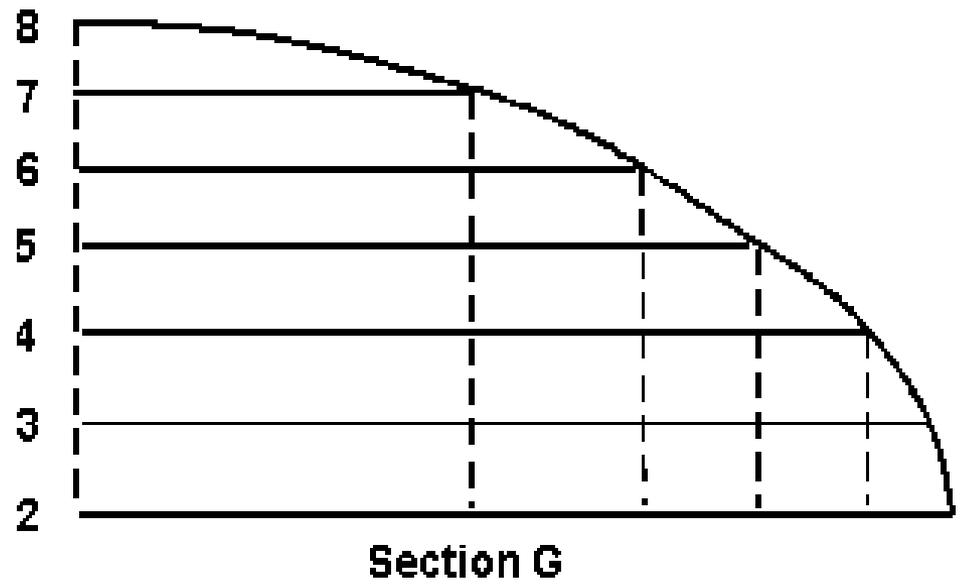
Parallel contours spaced farther apart at the bottom and closer together at the top of the slope.



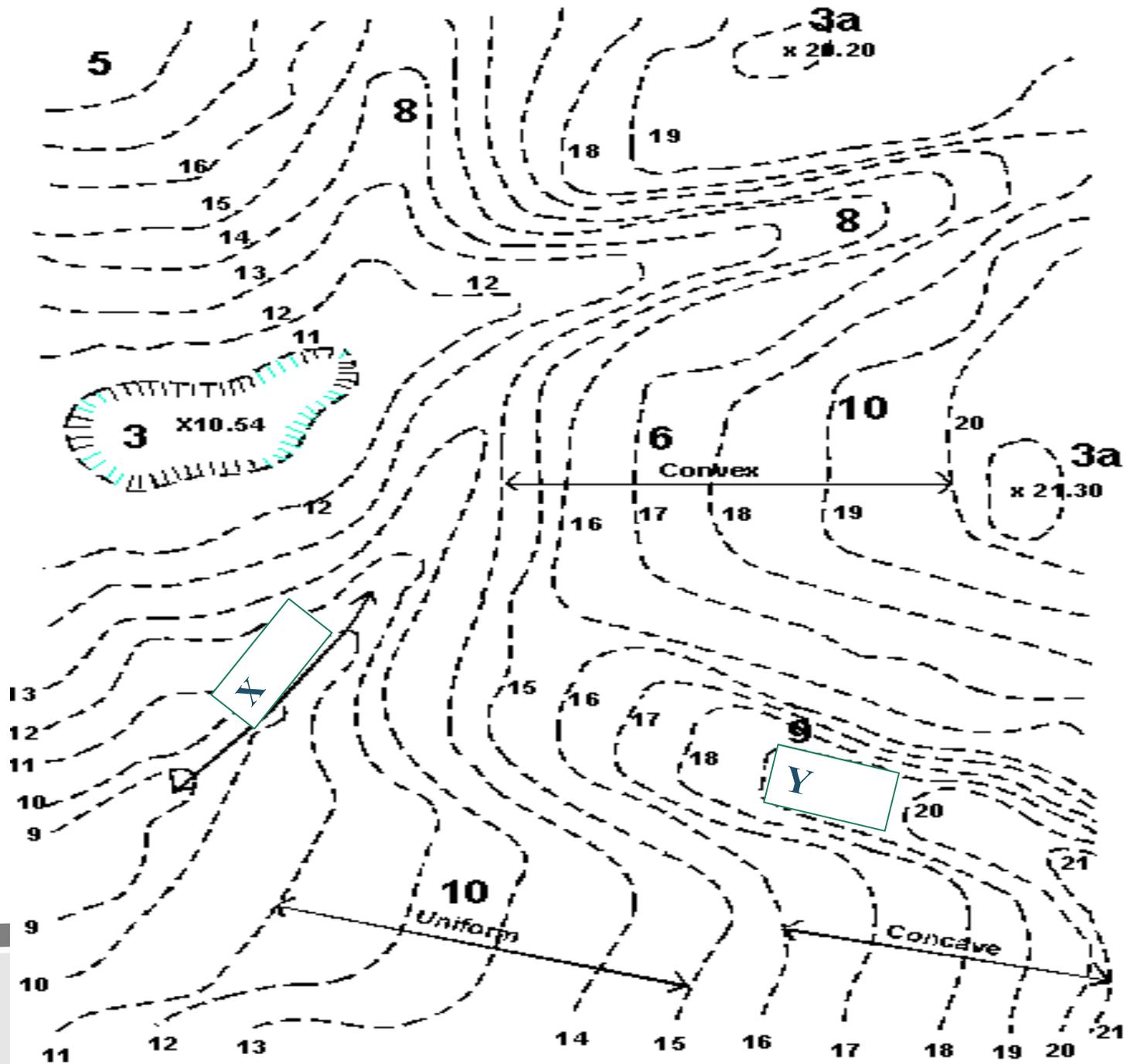


Convex slope

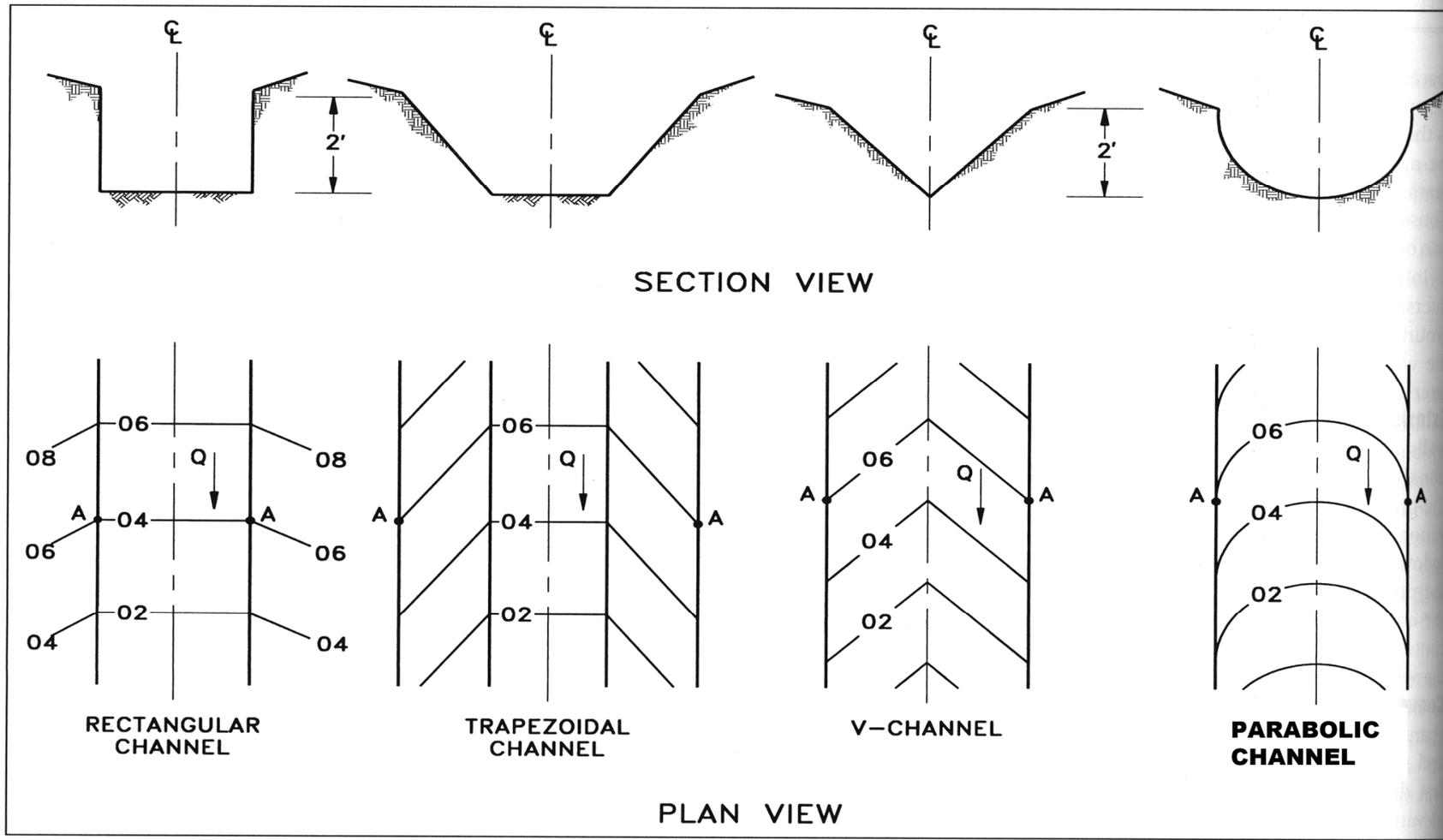
Parallel contours spaced closer together at the bottom and farther apart at the top of the slope.



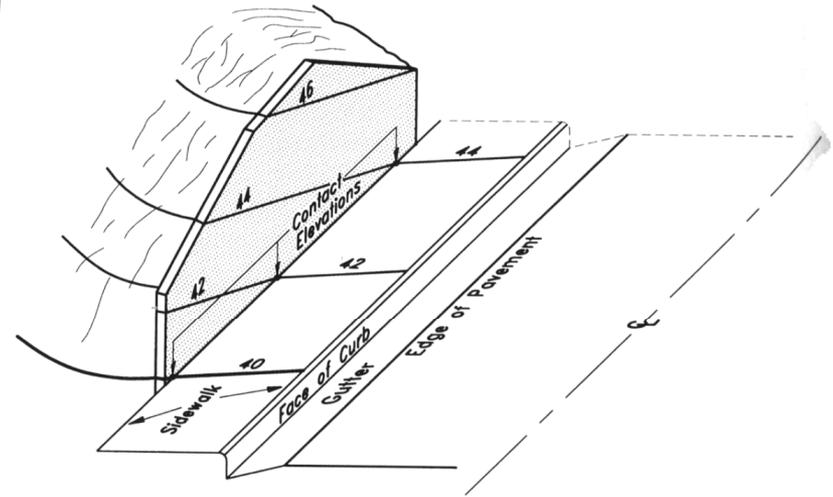
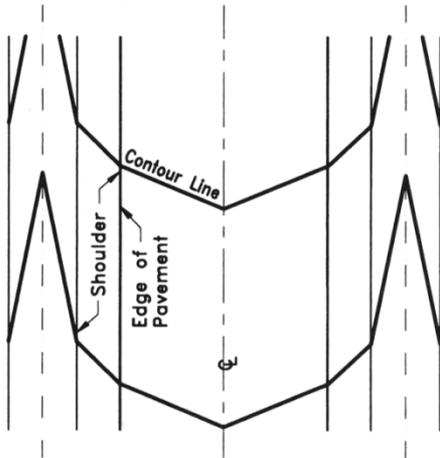
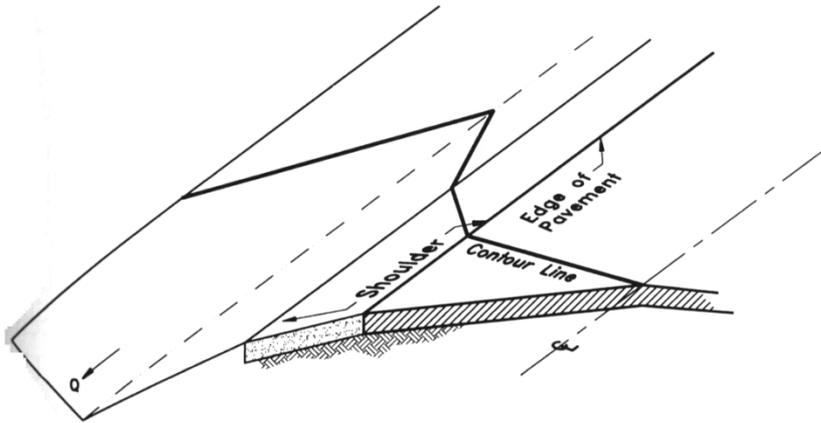
Characteristics of Contours



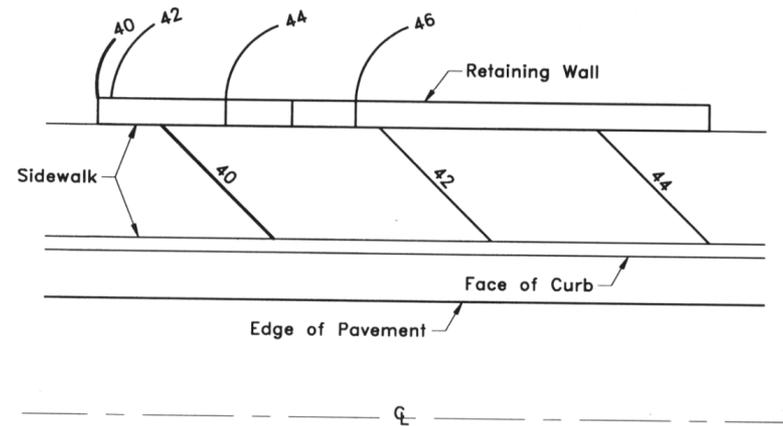
Contours (Channels)



Contours (Roads)

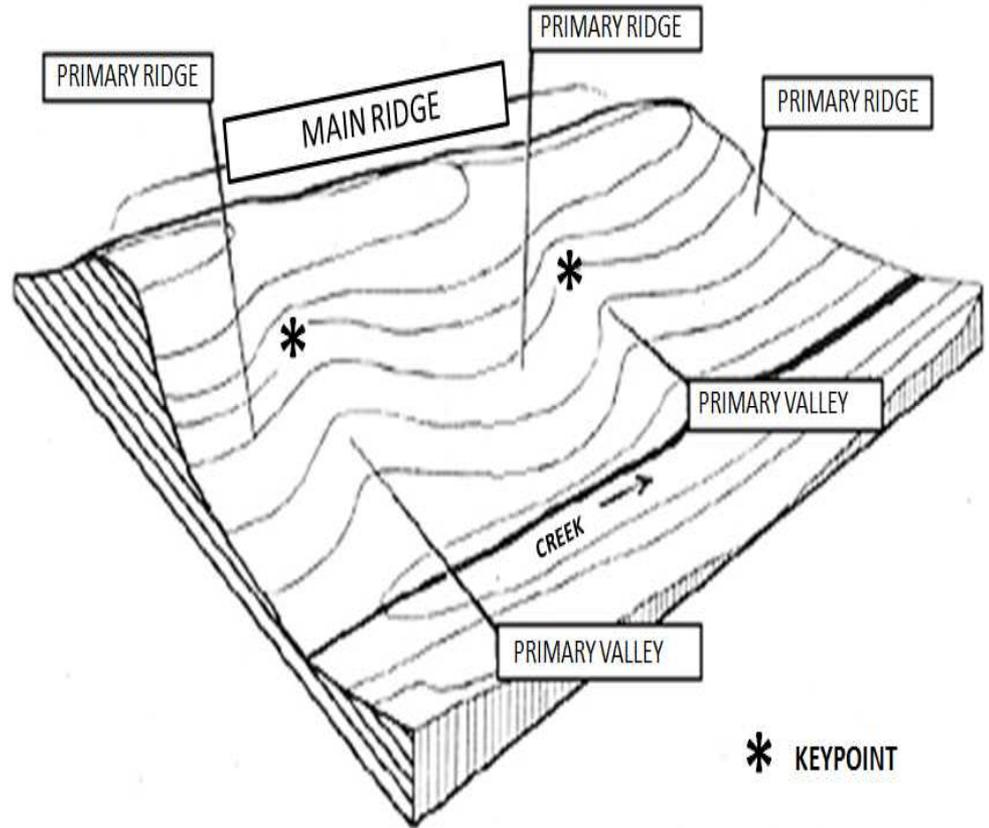
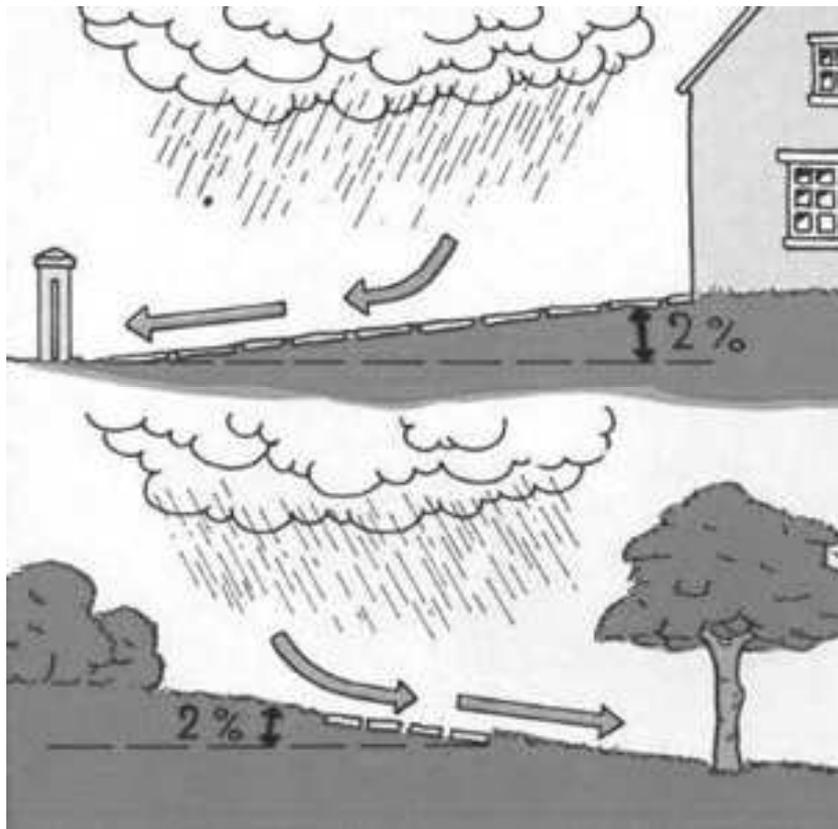


Schematic



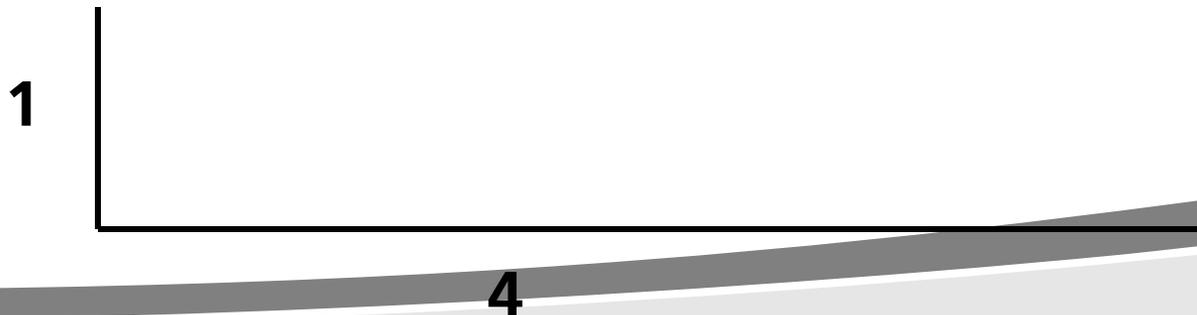
Plan

Ratio and Percent Slope Calculations

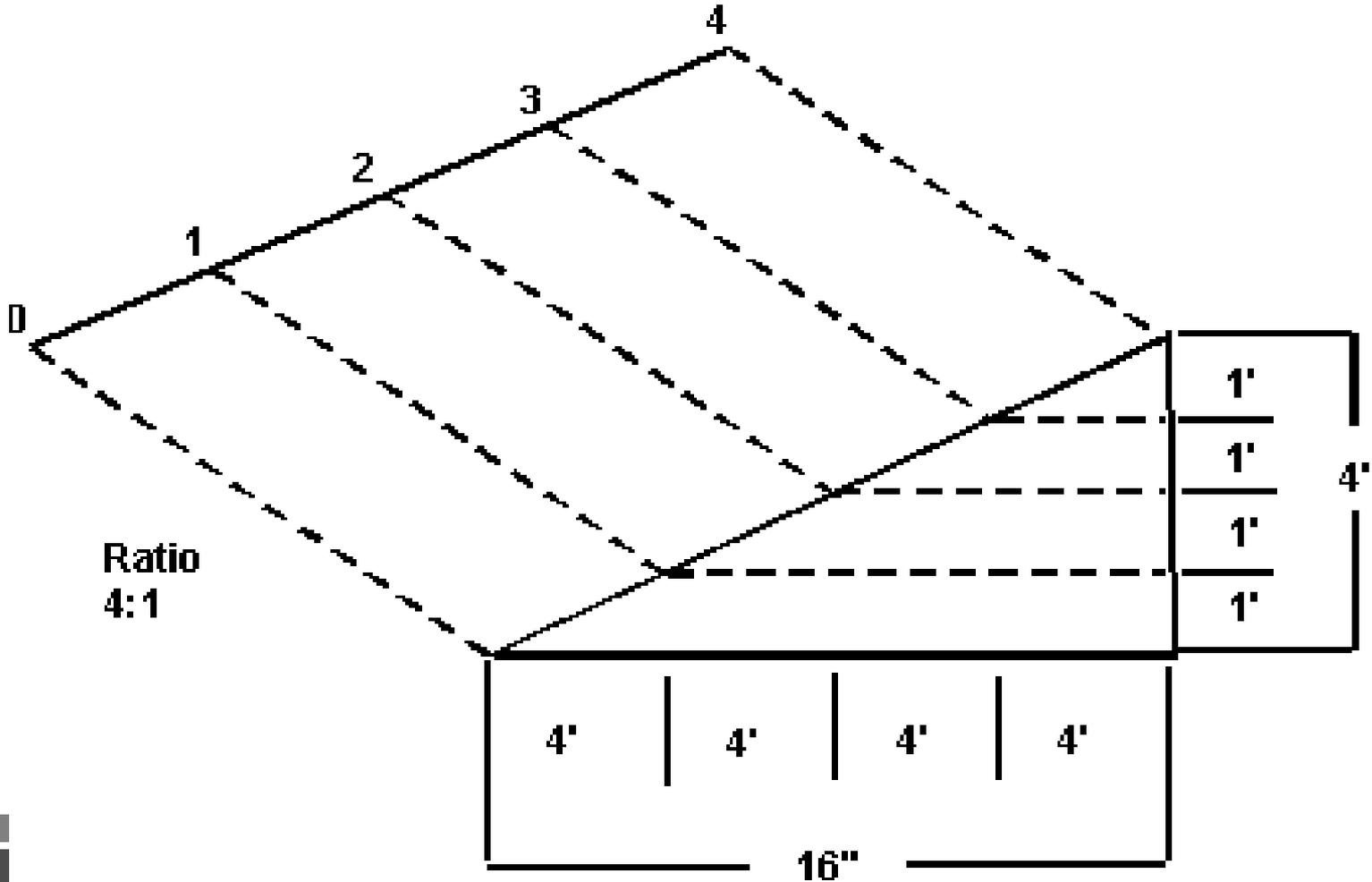


Slopes and slope calculations

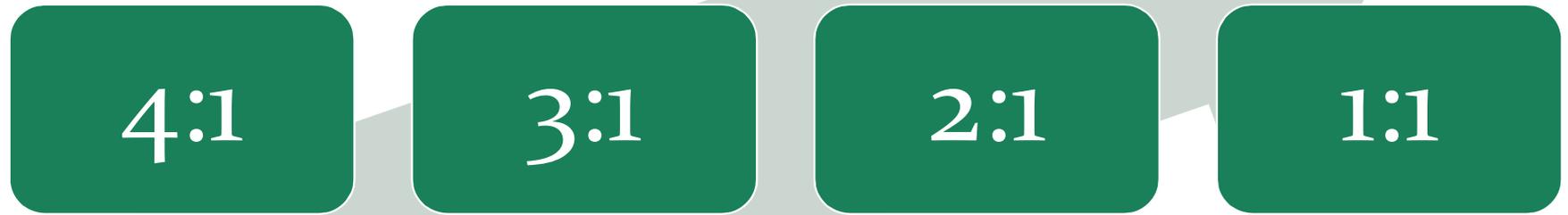
- Slope Ratios
- 2 to 1 or 2:1
- 4:1 means that four feet of horizontal space are required for each one foot of vertical change in elevation



Slope Ratio



SLOPES



Steeper!



PERCENT SLOPES

Vertical Distance

VD

Horizontal Distance

HD

- $3:1 = 1/3 = 0.3333$ or $33 \frac{1}{3} \%$
- $4:1 = 1/4 = 0.25$ or 25%
- $5:1 = ? \%$



PERCENT SLOPES

Vertical Distance

VD

Horizontal Distance

HD

- $3:1 = 1/3 = 0.3333$ or $33 \frac{1}{3} \%$
- $4:1 = 1/4 = 0.25$ or 25%
- $5:1 = 20\%$



Example

A slope that is 70 feet long, and has a rise in elevation from the 20 foot contour to the 60 foot contour is a _____ % slope.

Vertical Distance =

Horizontal Distance =



Example

A slope that is 70 feet long, and has a rise in elevation from the 20 foot contour to the 60 foot contour is a _____ % slope.

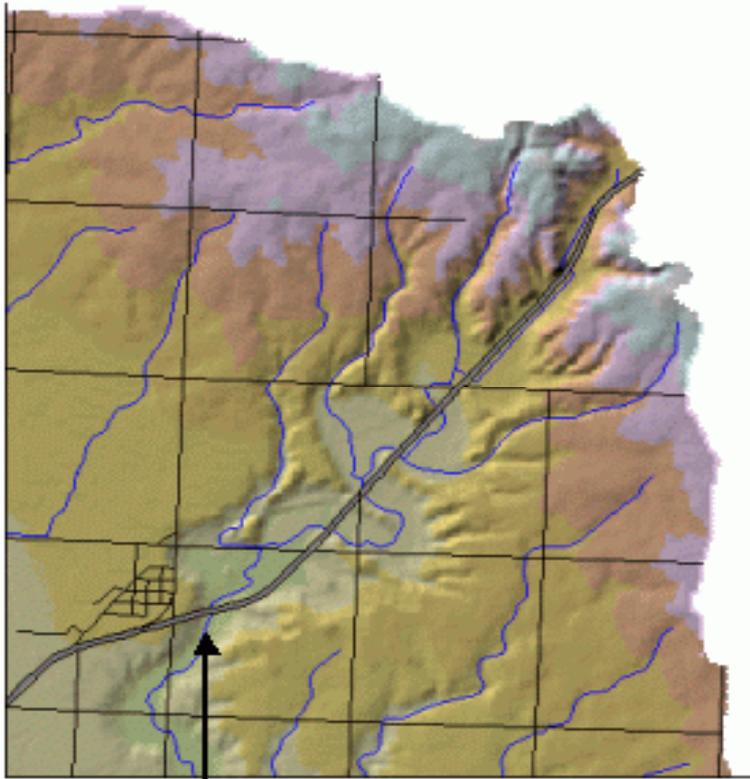
Vertical Distance = 40 feet

Horizontal Distance = 70 feet

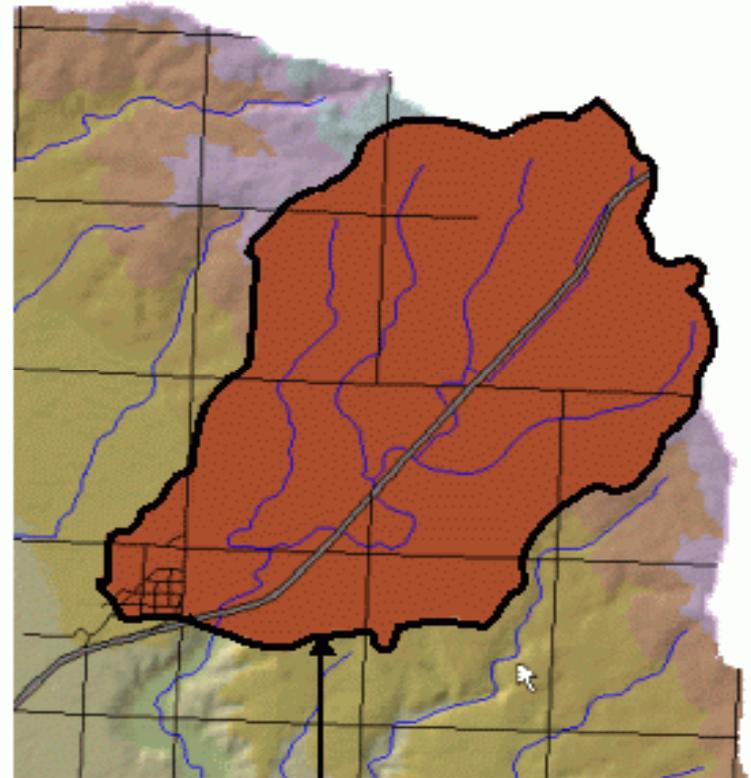
40 feet / 70 feet = .57 or 57%

Is that a critical slope?

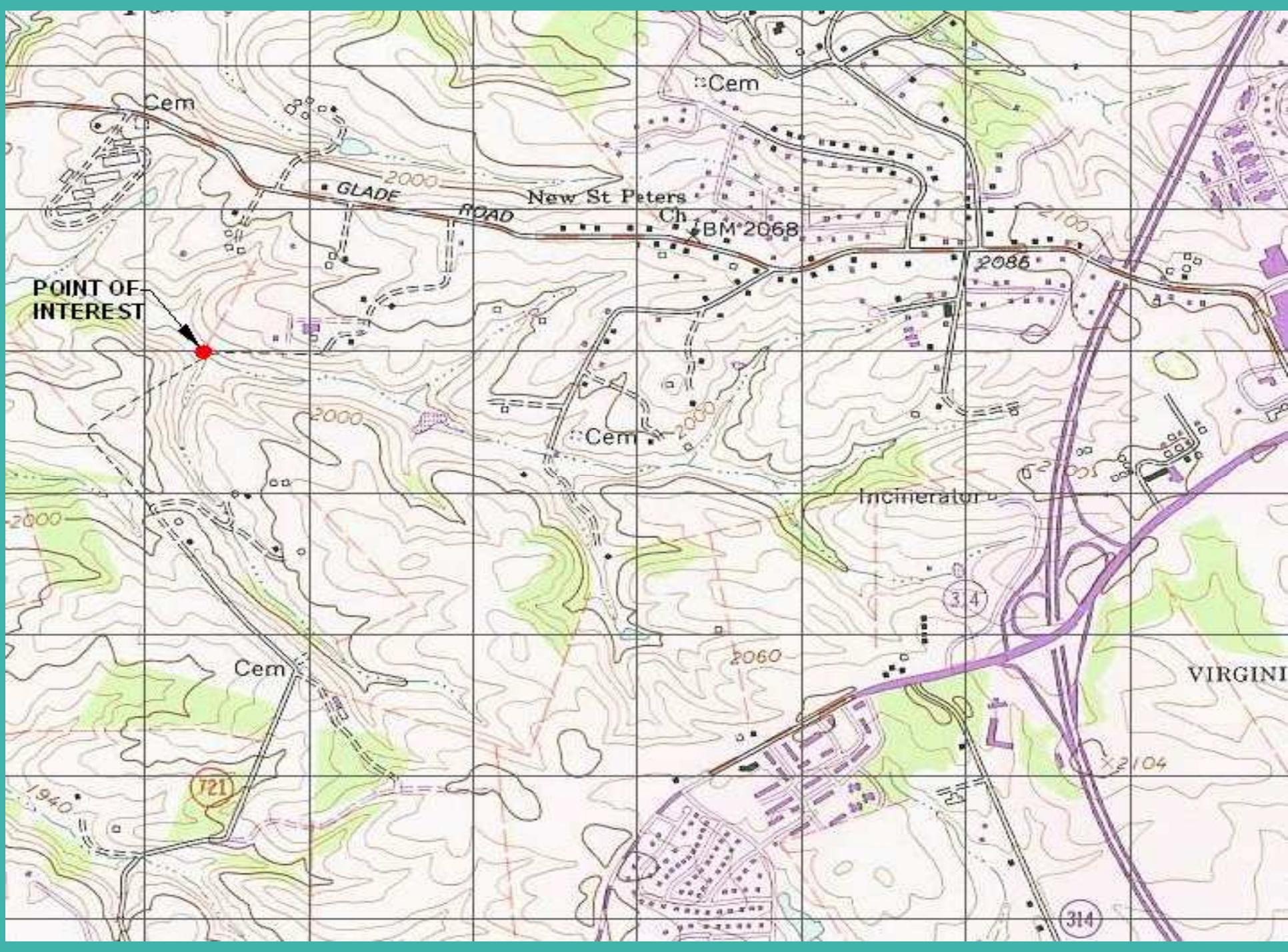
Using Contours for Watersheds

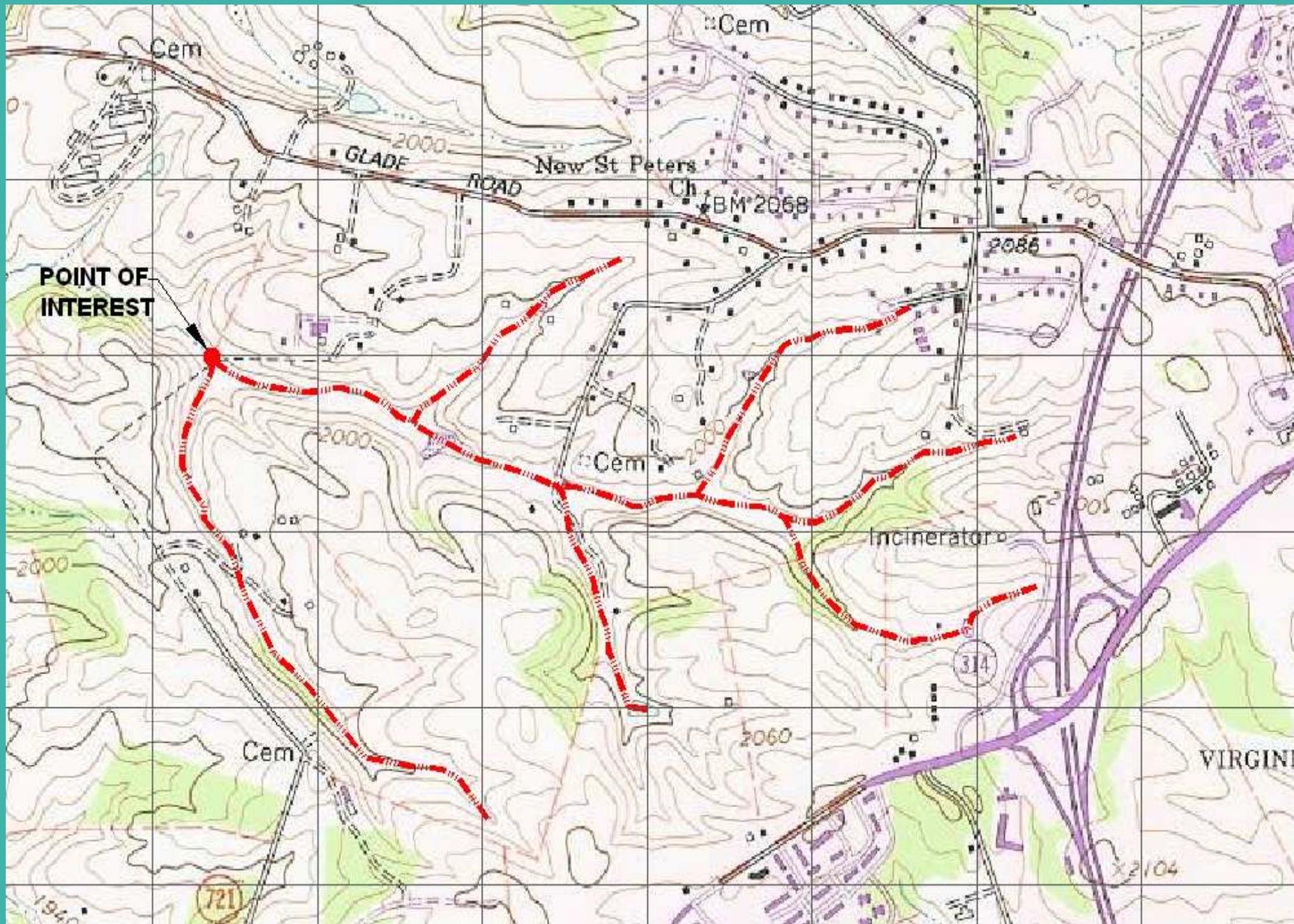


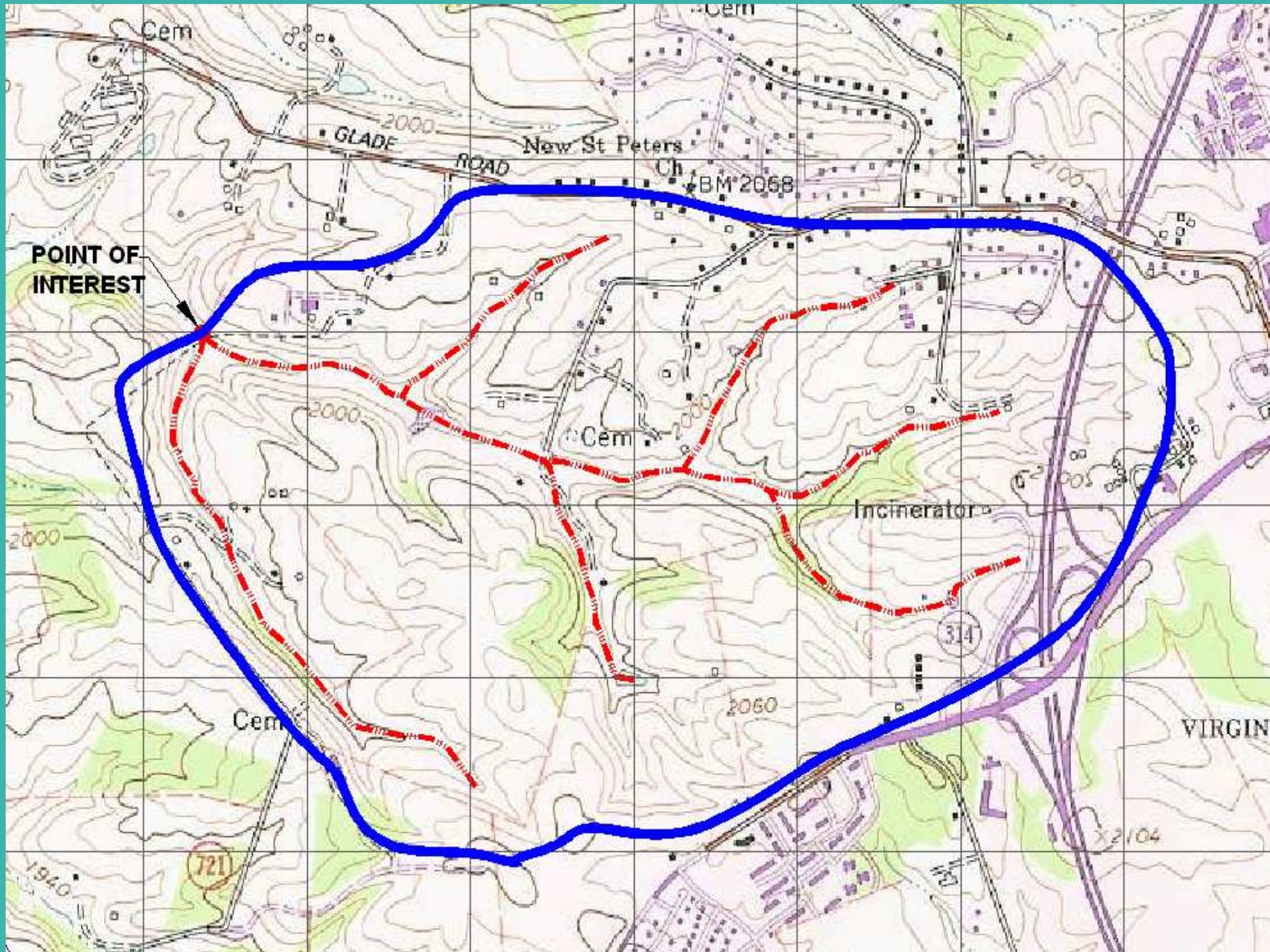
Watershed Outlet



Watershed Boundary









7b.

The Erosion and Sediment Control Plan



The Erosion and Sediment Control Plan

- **Erosion and Sediment Control Planning should be an integral part of the site planning process, for every project, not an afterthought.**
- **Planning for E&S is JUST as important as any other aspect of a construction project.**



The Erosion and Sediment Control Plan

- **Costly E&S measures can be minimized if the site design can be adapted to the existing site conditions, and good conservation principles are used.**
- **Use the strengths of existing site conditions to enhance E&S designs.**



The Erosion and Sediment Control Plan

- **Keep in mind how the site will develop during construction.**
- **Sequence installation of E&S controls properly.**



What is an Erosion and Sediment Control Plan?

Simply stated, an E&S Plan is a document that:

- **Describes the potential for erosion and sedimentation on a construction project.**
- **Explains and illustrates the measures to be taken to controls these problems.**



The Erosion and Sediment Control Plan

- An E&S Plan should be an independent document separate from working or construction drawings.
- It should “stand alone” to specifically address the requirements for E&S control installation, maintenance, removal, etc.



The Erosion and Sediment Control Plan

- **The owner or lessee of the land being developed has the responsibility for plan preparation and submission**



The Narrative



Written
portion or
"Narrative"

The Narrative

- Is an important tool for the plan reviewer to provide concise information about the project
- Is an important tool for implementation of the plan for the superintendent



The Parts of a Narrative



Written
portion or
"Narrative"

- Project Description
- Existing site Conditions
- Adjacent Properties
- Off-site Areas
- Soils
- Critical Areas
- Erosion and Sediment Control Measures
- Permanent Stabilization
- Stormwater Runoff Considerations
- Calculations
- Maintenance



The Parts of a Illustrative Plan



Illustrative
portion or
"Plan"

- Cover sheet with a small vicinity map showing the general location of the project
- Soils map
- A map showing the drainage areas and general drainage directions on the site
- A site map showing the original conditions
- A plat showing the proposed development including the ESC plans
- A detail sheet of the ESC measures



7c.

What is an adequate plan?



What is an Adequate Plan?

The primary guidelines for determining E&S plan adequacy are:

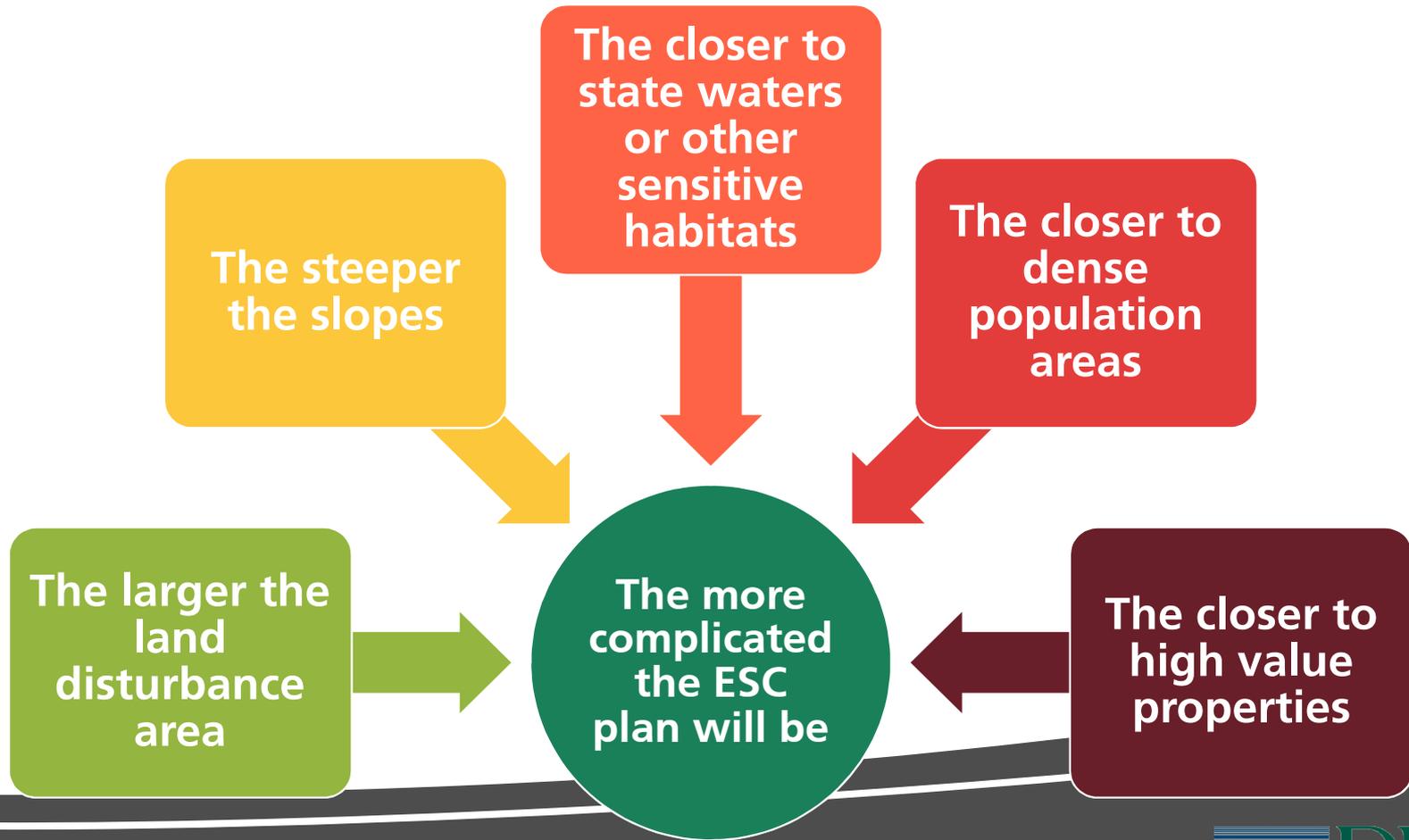
- **Minimum Standards of the Virginia Erosion and Sediment Control Regulations.**
- **Specifications of the Virginia Erosion and Sediment Control Handbook (chap. 3).**
- **Local ordinance requirements.**
- **Plan review checklist (Guidance)**



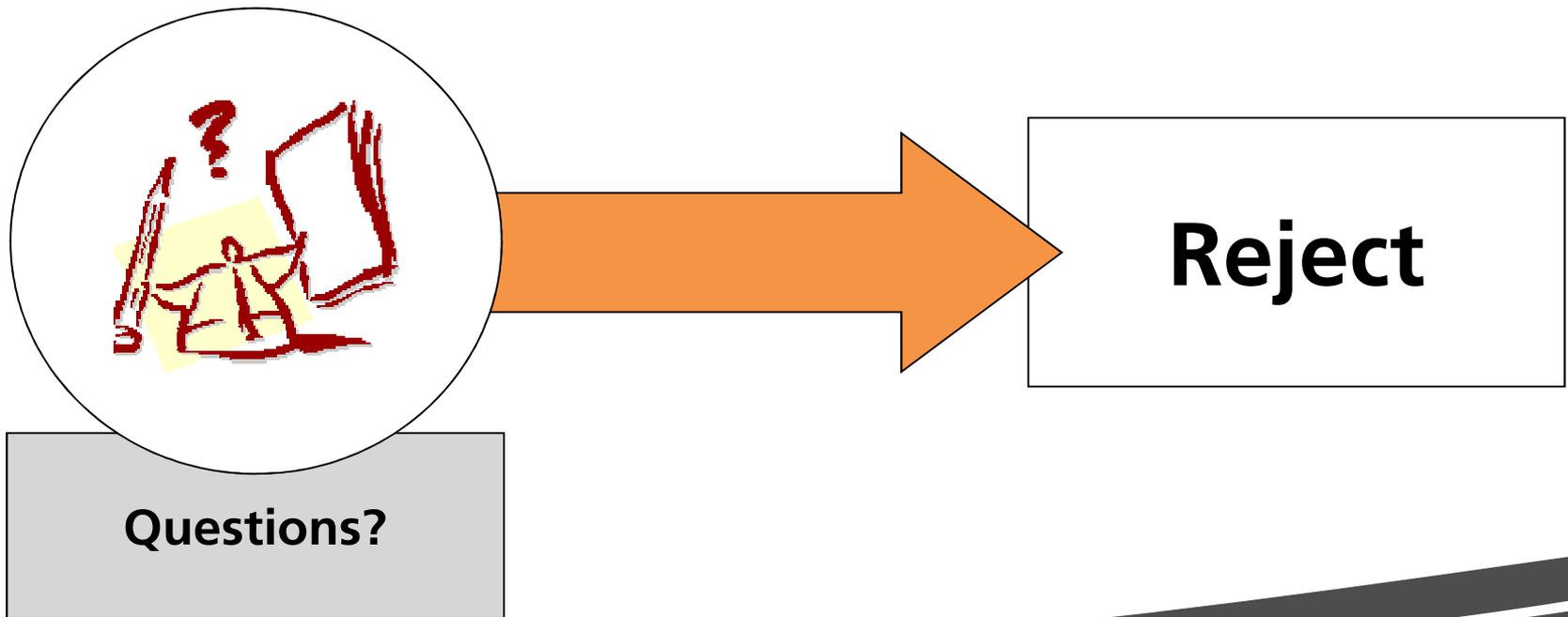
What is an Adequate Plan?

- **Contains enough information to satisfy the plan approving authority to ensure that the problems of erosion and sedimentation have been adequately addressed.**

Plan Review



Plan Review





Plan Submittal and Review

Who is responsible for preparing a Plan?

- The owner or lessee of the land being developed.
- This may be delegated to an engineer, architect or contractor, but the owner retains the ultimate responsibility to ensure the plan is prepared, submitted and approved.

62.1-44.15:55(G)



Plan Submittal and Review

62.1-44.15:55(A) of the VESCL requires an approved plan before land disturbing activity takes place.

62.1-44.15:55(B) requires the plan approving authority to grant approval of an E&S plan within 60 days of receipt.

If the plan is inadequate, written notice of disapproval which specifies needed modifications, terms and conditions must be communicated to the applicant (within 45 days).



Plan Submittal and Review

- **62.1-44.15:55(B) If no action is taken by the plan approving authority within 60 days, the plan is deemed approved.**



Variance Procedure

Request

- At time of plan submittal
- During construction when field conditions/situations changes
- Must be done in writing
- Cannot be granted for economic reasons (i.e. too expensive)

Review

- 10 days
- After 10 days, it is automatically denied
- Review must be judicious



Prior to Land Disturbance

- **62.1-44.15:55(B) effective July 1, 2003 requires that as a prerequisite to engaging in the land-disturbing activities, “Certified Responsible Land Disturber” be named who will be in charge of and responsible for carrying out the land disturbing activity.**
- * **The program authority has the option to waive the RLD requirement for an Agreement in Lieu of Plan for construction of a single family residence provided no violations occur.**

Plan Review Checklist – a good idea!



Written
portion or
"Narrative"

Narrative

- **Project Description**

Describe the nature and purpose of the land-disturbing activity, and the area (acres) to be disturbed.

- **Existing site Conditions**

Provide a description of the existing topography, vegetation and drainage of the site.

- **Adjacent Properties**

Provide a description of neighboring areas such as streams, lakes, residential areas, roads, etc., which might be affected by the land disturbance.

Written
portion or
"Narrative"

Narrative

•Off-site Areas

Describe any off-site land-disturbing activities that will occur (including borrow sites, stockpiles, etc.)

•Soils

Provide a brief description of the soils on the site giving such information as soil name, mapping unit, erodibility, permeability, depth, texture, and soil structure.

•Critical Areas

Provide a description of areas on the site which have potentially serious problems (steep slopes, channels, wet weather/underground springs, etc.)



Narrative



Written
portion or
"Narrative"

- **Erosion and Sediment Control Measures**

Provide a description of the methods which will be used to control erosion and sedimentation on the site. Chapter III VESCHB.

- **Permanent Stabilization**

Provide a brief description, including specifications, of how the site will be stabilized after construction is completed.

Written
portion or
"Narrative"

Narrative

•Stormwater Runoff Considerations

Will the development site cause an increase in peak runoff rates; and will it cause flooding or channel degradation downstream? Provide a description of the strategy used to control stormwater runoff.

•Calculations

Provide detailed calculations for the design of temporary sediment basins, permanent stormwater detention basins, diversions, channels, etc. Include calculations for pre- and post-development runoff.

•Maintenance

Provide a schedule of regular inspections and repair of E&SC structures.



Illustrative



Illustrative
portion or
"Plan"

- **Vicinity map**

A small map that locates the site in relation to the surrounding area. It should include any landmarks which might assist in locating the site.

- **North arrows**

- **Limits of clearing and grading**

This is a first step measure (MS-4), and these limits need to be clearly marked in the field. It also assists with natural area and/or tree protection.

Illustrative

- **Existing contours**

Represented in dashed lines, used to examine pre-development conditions, drainage areas, critical area, cut and fills and eventually the proper use of the proposed ESC measures.

- **Final contours**

Provide information on changes to the drainage patterns of the site, cut and fill information, steep slope information and allow determination of stormwater discharge from the site.

- **Existing vegetation**

Used for the preservation of green spaces and tree protection.

Illustrative

- Soils

To assist the soils section in the narrative.

- Existing drainage patterns

Provide an indication of drainage patterns and drainage areas that need to be treated with the ESC measures.

- Critical erosion areas

To assist the critical area section in the narrative including steep and long slopes, state waters, threatened and endangered species areas, etc.



Illustrative

Illustrative
portion or
"Plan"

- **Site development**

- Show the ultimate development of the site.

- **Location of the practices**

- All proposed ESC practices need to be location on the plans.



Plan Review Exercise

Written
portion or
"Narrative"



Narrative

- Project Description
- Existing site Conditions
- Adjacent Properties
- Off-site Areas
- Soils
- Critical Areas
- Erosion and Sediment Control Measures
- Permanent Stabilization
- Stormwater Runoff Considerations
- Calculations
- Maintenance

Illustrative
portion or
"Plan"



Illustrative

- Vicinity map
- North arrows
- Limits of clearing and grading
- Existing contours
 Final contours
- Existing vegetation
- Soils
- Existing drainage patterns
- Critical erosion areas
- Site development
- Location of the practices

LOONEY TUNES



"That's all Folks!"