BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

A METHODOLOGY FOR EVALUATING STEEP SLOPES AND ERODIBLE SOILS ADJACENT TO WATERCOURSES AND WETLANDS

I. Introduction

The Methodology outlined in this document is intended to provide guidance to anyone preparing a plan for a proposed land use activity that is subject to Sections 33-3-101 through 33-3-120 (Protection of Water Quality, Streams, Wetlands, and Floodplains) and Sections 33-2-101 through 33-2-906 (Chesapeake Bay Critical Areas Protection) of the Baltimore County Code. While this document specifically refers to forest buffers, the methodology presented herein also applies to the expansion of Critical Area buffers as required by Section 33-2-401 of the Code.

The requirements for maintenance of forest buffers along stream systems are presented in these regulations. Specific design standards for forest buffers are outlined in Section 33-3-111 of the Code. In addition to the general requirements for minimum forest buffers, this section specifies that the width of the forest buffer shall be adjusted to include contiguous sensitive areas such as steep slopes or erodible soils. A general outline of the evaluation procedures and criteria for determining the width adjustment is outlined in this section.

However, this document provides a more detailed explanation of the procedures and criteria including step-by-step instructions for evaluating sensitive areas to determine the extent to which the forest buffer width must be adjusted, illustrations, and a sample forest buffer analysis.

It is anticipated that this document will answer most questions on the evaluation procedures and should be utilized routinely in conducting site evaluations to determine the required forest buffer width.

II. Applicability

A forest buffer analysis must be conducted in accordance with the evaluation procedures and criteria outlined in this document, or a comparable method approved by the Director of this Department, for sites containing or adjacent to streams, wetlands or other water bodies, where:

A. slopes exceed 10% within 500 feet of the streams, wetlands, or water bodies;

B. soil erodibility K values exceed 0.24 (i.e. scores “medium” or “high” in Appendix A) within 500 feet of the streams, wetlands, or water bodies; or

C. the vegetative cover within 100 feet of the streams, wetlands, or water bodies is bare soil, fallow land, crops, active pasture in poor or fair condition, orchard-tree farm in poor or fair condition, brush-weeds in poor condition, or woods in poor condition.

III. Evaluation Report

An evaluation report must be submitted for review to this Department. This report must include, as a minimum, the following:

A. A plan, at a scale not greater than 1" = 100', that shows:

1. existing topography with contour intervals no greater than 5 feet, prepared from the best available information. Baltimore County geographic information system topography is an acceptable source for preparing existing topography for a site;

2. mapped soils from the USDA Natural Resources Conservation Service "Web Soil Survey" (replaces Baltimore County Soil Survey);

3. field delineated, marked and surveyed wetlands (if applicable, separately delineate and survey tidal wetlands);

4. existing vegetation;

5. existing subdrainage areas of the site; and

6. slopes in each subdrainage area segmented into sections of slopes ≤10%, 11-19%, and ≥20%;

B. all forest buffer analysis data forms;

C. a summary of findings including information pertinent to the evaluation of the site; and

D. a mitigation plan that describes the proposed additional protective measures for those areas where development is allowed with restrictions.

IV. Plan Preparation

The plan should be prepared for use in the forest buffer analysis as outlined below:

A. Divide the site into existing subdrainage areas.

B. Segment slopes along a stream valley by differentiating areas with slope gradients of ≤10%, 11-19%, and ≥20%. Significant changes in soil erodibility, vegetative cover, and proximity to the resource will require additional segmentation during the evaluation process.

C. Plot transects at various points along the slope to be evaluated. A transect is developed by tracing a flow path from the crest of the slope to the edge of the wetland, or top of the streambank where no wetland exists, along a line perpendicular to the contours of the slope. The number of transects necessary to analyze a particular slope depends on the degree of confidence the evaluator has that the transects plotted accurately characterize the slope. Generally, a slope with a uniform shape along its face can be characterized with a few well chosen transects. A slope with an irregular shape will require more transects.

V. Evaluation Procedures and Criteria

Using the evaluation procedures below, and the criteria outlined in Table 1, analyze each segment along a transect starting from the crest of the slope and working downslope to the resource. Record all data on evaluation worksheets for submission with the site plan.

TABLE 1

EVALUATION CRITERIA

FACTORS	SCORES		
	High (10)	Medium (5)	Low (0)
Slope (S)	S $\geq$ 20%	10% < S < 20%	S $\leq$ 10%
Slope Length (SL)	SL $\geq$ 200'	50' < SL < 200'	SL $\leq$ 50'
Soil Erodibility (K) (Web Soil Score)	K $\geq$ 0.32 (High)	0.24 < K < 0.32 (Medium)	K $\leq$ 0.24 (Low)
Vegetative Cover	Bare soil, fallow land, crops, active pasture in poor condition, orchard-tree farm in poor condition	Active pasture in fair condition, brush-weeds in in poor condition, orchard-tree farm in fair condition, woods in poor condition	Active pasture in good condition, undisturbed meadow, brush-weeds in fair condition, orchard-tree farm in good condition, woods in fair condition
Sediment Delivery (Distance from downslope limit of disturbance to outer edge of wetlands or top of streambank)	Adjacent to watercourses or wetlands (< 100' buffer)	Adjacent to watercourses or wetlands (100-300' buffer)	Not adjacent to watercourses or wetlands (> 300' buffer)

STEP 1: Measure and record the following data for each segment along a transect.

Slope: the average percent slope in that segment

Slope Length: the cumulative slope length, measured from the crest of the slope to the bottom of the segment being evaluated

Soil Erodibility: the soil erodibility score per the Web Soil Scores in Appendix A

Vegetative Cover: the vegetative type and hydrologic condition for the segment immediately downslope of the segment being evaluated (see Appendix B). It is assumed that the segment being evaluated will be cleared and graded; therefore, this factor is a measure of the type and quality of the vegetation downslope from the disturbed area.

Sediment Delivery: The distance from the bottom of the segment being evaluated to the resource (i. e., edge of wetland or top of streambank)

STEP 2: Compare the measured values to the range of values given for each factor above (Table 1). Assign the appropriate category (i. e., high, medium, or low) for each factor. Record this data on the worksheet. Within a segment, if two sets of values exist for a particular factor, and those values belong to different categories, this is an indication that the segment should be divided into two separate segments.

Example: The top one-third of a segment has a soil type which is in the low category for potential impacts. The lower two-thirds of that same segment has a soil type which is in the high category for potential impacts. These two areas should not be averaged. Instead they should be treated as distinct segments and evaluated separately.

STEP 3: Record the score associated with the category for each factor (i. e., 10, 5 or 0 from Table 1).

STEP 4: Determine the total score for the segment by summing the factor scores.

STEP 5: Based on the total score for the segment, determine whether that segment of the slope would have a high, medium, or low potential for impacting the resource if it were developed (Table 1).

This procedure is repeated until all the segments on each transect have been evaluated. A segment of a subdrainage area with a total score of 35 or greater shall be designated as part of the forest buffer and no development shall be approved in that segment. A segment with a total score of 25 or 30 shall require the application of additional protective measures. However, development is not prohibited and that area is not required to be part of the forest buffer. A

segment with a score of 20 or less shall be developed with standard protective measures and that area is not part of the forest buffer.

Beyond the forest buffer a setback will be established. The purpose of this setback is to prevent encroachment into the forest buffer during the active construction phase of the development, and to provide a useable area after the dwellings or buildings have been occupied. The setback to primary structures is 35 feet from the edge of the forest buffer for residential structures, and 25 feet from the edge of the forest buffer for commercial structures. Within this setback it is permissible to construct small sheds, swimming pools, etc. Maintenance of vegetation (i. e., mowing, pruning, planting, etc.) is also permissible in the setback.

The forest buffer is subject to protective covenants, which restrict its disturbance and use. These restrictions are generally described in Section 33-3-112 of the Baltimore County Code (see also Section 33-2-204 of the Code for Chesapeake Bay Critical Area restrictions).

Once the site has been evaluated, it is then possible to design a development that avoids disturbance of those areas with a high potential for impacts. If the development is designed without consideration of these and other environmental constraints, delays in processing and plan revisions will result.

APPENDIX A

WEB SOIL SCORES (SOIL ERODIBILITY SCORES)

Notice to Users:

"High" , "Medium", and "Low" values were assigned to each soil map unit in place of K factor values to aid users of this document in determining which soil erodibility scores to use. The Web Soil Survey contains a multitude of K factor values for each soil map unit. All of these values were taken into consideration when assigning the "High", "Medium", and "Low" values in Appendix A.

WEB SOIL SCORES (SOIL ERODIBILITY SCORES)

Map Unit Symbol	Map Unit Name	Soil Erodibility Score
BaA	Baile silt loam, 0 to 3 percent slopes	High
BaB	Baile silt loam, 3 to 8 percent slopes	High
BbB	Baile-Urban land complex, 0 to 8 percent slopes	High
BcA	Baltimore gravelly loam, 0 to 3 percent slopes	High
BcB	Baltimore gravelly loam, 3 to 8 percent slopes	High
BcC	Baltimore gravelly loam, 8 to 15 percent slopes	High
BdB	Baltimore-Urban land complex, 0 to 8 percent slopes	High
BeA	Beltsville silt loam, 0 to 2 percent slopes	High
BeB	Beltsville silt loam, 2 to 5 percent slopes	High
BeC	Beltsville silt loam, 5 to 10 percent slopes	High
BfB	Beltsville-Urban land complex, 0 to 5 percent slopes	High
BfD	Beltsville-Urban land complex, 5 to 15 percent slopes	High
BgA	Benevola silt loam, 0 to 3 percent slopes	Medium
BgB	Benevola silt loam, 3 to 8 percent slopes	Medium
BgC	Benevola silt loam, 8 to 15 percent slopes	Medium
BhB	Brinklow channery loam, 3 to 8 percent slopes	High
BhC	Brinklow channery loam, 8 to 15 percent slopes	High
BhD	Brinklow channery loam, 15 to 25 percent slopes	High
CaB	Chillum silt loam, 0 to 5 percent slopes	High
CaC	Chillum silt loam, 5 to 10 percent slopes	High
CbB	Chillum-Urban land complex, 0 to 5 percent slopes	High
CbD	Chillum-Urban land complex, 5 to 15 percent slopes	High
CcB	Christiana silt loam 2 to 5 percent slopes	High
CcC	Christiana silt loam, 5 to 10 percent slopes	High
CdB	Christiana-Urban land complex, 0 to 5 percent slopes	High
CdD	Christiana-Urban land complex, 5 to 15 percent slopes	High
CeB	Chrome silt loam, 3 to 8 percent slopes	High
CeC	Chrome silt loam, 8 to 15 percent slopes	High
CeD	Chrome silt loam, 15 to 25 percent slopes	High
CfA	Codorus silt loams, 0 to 3 percent slopes	High
CgA	Comus silt loam, 0 to 3 percent slopes	High
ChA	Conestoga silt loam, 0 to 3 percent slopes	High
ChB	Conestoga silt loam, 3 to 8 percent slopes	High
ChC	Conestoga silt loam, 8 to 15 percent slopes	High
CkB	Conestoga-Urban Land complex, 0 to 8 percent slopes	High
CkC	Conestoga-Urban Land complex, 8 to 15 percent slopes	High
CmA	Corsica mucky loam, 0 to 2 percent slopes	High
CnB	Croom gravelly sandy loam, 2 to 5 percent slopes	Low
CnC	Croom gravelly sandy loam, 5 to 10 percent slopes	Low
CnD	Croom gravelly sandy loam, 10 to 15 percent slopes	Low
CoB	Croom-Urban land complex, 0 to 5 percent slopes	Low
CoD	Croom-Urban land complex, 5 to 15 percent slopes	Medium
CpA	Crosiadore silt loam, 0 to 2 percent slopes	High
CrA	Cumberstone silt loam, 0 to 2 percent slopes	High
CrB	Cumberstone silt loam, 2 to 5 percent slopes	High

WEB SOIL SCORES (SOIL ERODIBILITY SCORES)

Map Unit Symbol	Map Unit Name	Soil Erodibility Score
CrC	Cumberstone silt loam, 5 to 10 percent slopes	High
CsB	Cumberstone-Urban land complex, 0 to 5 percent slopes	High
DAM	Dam	N/A
DbB	Delanco silt loam, 3 to 8 percent slopes	High
DbC	Delanco silt loam, 8 to 15 percent slopes	High
DcB	Delanco-Urban land complex, 0 to 8 percent slopes	High
EaB	Edgemont channery loam, 3 to 8 percent slopes	Low
EaC	Edgemont channery loam, 8 to 15 percent slopes	Low
EaD	Edgemont channery loam, 15 to 25 percent slopes	Low
EbE	Edgemont-Rock outcrop complex, 25 to 45 percent slopes	Low
EcB	Elioak silt loam, 3 to 8 percent slopes	High
EcC	Elioak silt loam, 8 to 15 percent slopes	High
EdB	Elioak-Urban Land Complex, 0 to 8 percent slopes	High
EeA	Elkton silt loam, 0 to 2 percent slopes	High
EfA	Elkton-Urban land complex, 0 to 2 percent slopes	High
EgB	Elsinboro silt loam, 3 to 8 percent slopes	High
EgC	Elsinboro silt loam, 8 to 15 percent slopes	High
FaA	Fallsington sandy loam, 0 to 2 percent slopes	Low
FBA	Fallsington-Urban land complex, 0 to 2 percent slopes	Low
FcB	Fort Mott loamy sand, 0 to 5 percent slopes	Low
FdB	Fort Mott-Urban land complex, 0 to 5 percent slopes	Low
GaB	Gaila loam, 3 to 8 percent slopes	Medium
GaC	Gaila loam, 8 to 15 percent slopes	Medium
GaD	Gaila loam, 15 to 25 percent slopes	Medium
GbB	Galestown loamy sand, 0 to 5 percent slopes	Low
GbC	Galestown loamy sand, 5 to 10 percent slopes	Low
GcB	Galestown-Urban land complex, 0 to 5 percent slopes	Low
GdA	Glenelg loam, 0 to 3 percent slopes	Medium
GdB	Glenelg loam, 3 to 8 percent slopes	Medium
GdC	Glenelg loam, 8 to 15 percent slopes	Medium
GeA	Glenelg channery loam, 0 to 3 percent slopes	High
GeB	Glenelg channery loam, 3 to 8 percent slopes	High
GeC	Glenelg channery loam, 8 to 15 percent slopes	High
GfB	Glenelg-Urban land complex, 0 to 8 percent slopes	Medium
GfC	Glenelg-Urban land complex, 8 to 15 percent slopes	Medium
GhA	Glenville silt loam, 0 to 3 percent slopes	High
GhB	Glenville silt loam, 3 to 8 percent slopes	High
GhC	Glenville silt loam, 8 to 15 percent slopes	High
GkB	Glenville-Urban land complex, 0 to 8 percent slopes	High
HaA	Hambrook sandy loam, 0 to 2 percent slopes	Low
HaB	Hambrook sandy loam, 2 to 5 percent slopes	Low
HbA	Hatboro silt loams, 0 to 3 percent slopes	High
HoB	Hollinger silt loam, 3 to 8 percent slopes	High
HoC	Hollinger silt loam, 8 to 15 percent slopes	High
HrC	Hollinger and Linganore channery silt loams, 8 to 15 percent slopes, rocky	High

WEB SOIL SCORES (SOIL ERODIBILITY SCORES)

Map Unit Symbol	Map Unit Name	Soil Erodibility Score
HrD	Hollinger and Linganore channery silt loams, 15 to 25 percent slopes, rocky	High
IsA	Issue silt loam, occasionally flooded	High
IuA	Issue-Urban land complex, occasionally flooded	High
JaB	Jackland silt loam, 3 to 8 percent slopes	High
JuB	Jackland-Urban land complex, 0 to 8 percent slopes	High
KeA	Keyport silt loam, 0 to 2 percent slopes	High
KeB	Keyport silt loam, 2 to 5 percent slopes	High
KeC	Keyport silt loam, 5 to 10 percent slopes	High
KuB	Keyport-Urban land complex, 0 to 5 percent slopes	High
KuD	Keyport-Urban land complex, 5 to 15 percent slopes	High
LeB	Legore silt loam, 3 to 8 percent slopes	Low
LeC	Legore silt loam, 8 to 15 percent slopes	Low
LeD	Legore silt loam, 15 to 25 percent slopes	Low
LeE	Legore silt loam, 25 to 45 percent slopes	High
LfB	Legore silt loam, 3 to 8 percent slopes, very stony	Low
LfC	Legore silt loam, 8 to 15 percent slopes, very stony	Low
LfD	Legore silt loam, 15 to 25 percent slopes, very stony	Low
LfE	Legore silt loam, 25 to 45 percent slopes, very stony	High
LgB	Legore-Montalto-Urban land complex, 0 to 8 percent slopes	Low
LgC	Legore-Montalto-Urban Land complex, 8 to 15 percent slopes	Low
LsA	Lindside silt loam, 0 to 3 percent slopes	High
LuA	Lindside-Urban Land complex, 0 to 3 percent slopes	High
MaB	Manor loam, 3 to 8 percent slopes	Medium
MaC	Manor loam, 8 to 15 percent slopes	Medium
MaD	Manor loam, 15 to 25 percent slopes	Medium
MaE	Manor loam, 25 to 45 percent slopes	High
MbB	Manor channery loam, 3 to 8 percent slopes	Medium
MbC	Manor channery loam, 8 to 15 percent slopes	Medium
MbD	Manor channery loam, 15 to 25 percent slopes	Medium
MbE	Manor channery loam, 25 to 45 percent slopes	High
McD	Manor-Bannertown sandy loams, 15 to 25 percent slopes, rocky	Medium
McE	Manor-Bannertown sandy loams, 25 to 45 percent slopes, rocky	High
McF	Manor-Bannertown sandy loams, 45 to 65 percent slopes, rocky	High
MdE	Manor-Brinklow complex, 25 to 45 percent slopes, very rocky	High
MdF	Manor-Brinklow complex, 45 to 65 percent slopes	High
MeB	Manor-Urban land complex, 0 to 8 percent slopes	Medium
MeC	Manor-Urban land complex, 8 to 15 percent slopes	Medium
MeD	Manor-Urban land complex, 15 to 25 percent slopes	High
MfA	Matapeake silt loam, 0 to 2 percent slopes	High
MfC	Matapeake silt loam, 5 to 10 percent slopes	High
MgB	Matapeake-Urban land complex, 0 to 5 percent slopes	High
MfB	Matapeake silt loam, 2 to 5 percent slopes	High
MhA	Mattapex silt loam, 0 to 2 percent slopes	High
MhB	Mattapex silt loam, 2 to 5 percent slopes	High
MhC	Mattapex silt loam, 5 to 10 percent slopes	High

WEB SOIL SCORES (SOIL ERODIBILITY SCORES)

Map Unit Symbol	Map Unit Name	Soil Erodibility Score
MkB	Mattapex-Urban land complex, 0-5 percent slopes	High
MkD	Mattapex-Urban land complex, 5 to 15 percent slopes	High
MmA	Melvin silt loam, 0 to 3 percent slopes	High
MnA	Melvin-Urban land Complex, 0 to 3 percent slopes	High
MoB	Montalto silt loam, 3 to 8 percent slopes	High
MoC	Montalto silt loam, 8 to 15 percent slopes	High
MpA	Mount Lucas silt loam, 0 to 3 percent slopes	High
MpB	Mount Lucas silt loam, 3 to 8 percent slopes	High
MrB	Mount Lucas silt loam, 3 to 8 percent slopes, stony	High
MrC	Mount Lucas silt loam, 8 to 15 percent slopes, stony	High
MsB	Mount Lucas-Urban land complex, 0 to 8 percent slopes	High
MT	Mispillion and Transquaking soils, 0 to 1 percent slopes, tidally flooded	Low
NeA	Neshaminy silt loam, 0 to 3 percent slopes	High
NeB	Neshaminy silt loam, 3 to 8 percent slopes	High
NeC	Neshaminy silt loam, 8 to 15 percent slopes	High
NM	Nanticoke and Mannington soils, very frequently flooded, tidal	High
OtA	Othello silt loam, 0 to 2 percent slopes	Low
OuB	Othello-Urban land complex, 0 to 5 percent slopes	Low
PT	Pits, Gravel	Low
QM	Quarry Marble, Active/inactive	Low
QS	Quarry Schist / Gneiss	Low
ReC	Relay silt loam, 8 to 15 percent slopes	Low
ReD	Relay silt loam, 15 to 25 percent slopes	Low
RfD	Relay gravelly loam, 15 to 25 percent slopes, very stony	Low
RfE	Relay gravelly loam, 25 to 45 percent slopes, very stony	Medium
RsB	Russett fine sandy loam, 2 to 5 percent slopes	Medium
RsC	Russett fine sandy loam, 5 to 10 percent slopes	Medium
RsD	Russett fine sandy loam, 10 to 15 percent slopes	Medium
RuB	Russett-Urban land complex, 0 to 5 percent slopes	Medium
RuD	Russett-Urban land complex, 5 to 15 percent slopes	Medium
SaA	Sassafras sandy loam, 0 to 2 percent slopes	Low
SaB	Sassafras sandy loam, 2 to 5 percent slopes	Low
SaC	Sassafras sandy laom, 5 to 10 percent slopes	Low
SaD	Sassafras sandy loam, 10 to 15 percent slopes	Low
SbA	Sassafras loam, 0 to 2 percent slopes	High
SbB	Sassafras loam, 2 to 5 percent slopes	High
SbC	Sassafras loam, 5 to 10 percent slopes	High
ScC	Sassafras-Croom complex, 5 to 10 percent slopes	Low
SDD	Sassafras and Croom soils, 10 to 15 percent slopes	Medium
SDE	Sassafras and Croom soils, 15 to 25 percent slopes	High
SfB	Sassafras-Urban land complex, 0 to 5 percent slopes	Low
ShD	Sassafras-Croom-Urban land complex, 5 to 15 percent slopes	Medium
TrB	Travilah silt loam, 3 to 8 percent slopes	High

WEB SOIL SCORES (SOIL ERODIBILITY SCORES)

Map Unit Symbol	Map Unit Name	Soil Erodibility Score
TrC	Travilah silt loam, 8 to 15 percent slopes	High
UaB	Udorthents, 0 to 8 percent slopes	Medium
UaC	Udorthents, 8 to 15 percent slopes	Medium
UaD	Udorthents, 15 to 25 percent slopes	Medium
UbF	Udorthents, flyash, 0 to 65 percent slopes	Low
UcF	Udorthents, highway, 0 to 65 percent slopes	Low
UdB	Udorthents, loamy, sulfidic substratum, 0 to 5 percent slopes	Medium
UeB	Udorthents, reclaimed gravel pits, 0 to 5 percent slopes	High
UeD	Udorthents, reclaimed gravel pits, 5 to 15 percent slopes	High
UfE	Udorthents, refuse, 3 to 45 percent slopes	Low
Ur	Urban land 0 to 8 percent slopes	Low
UuB	Urban land-Udorthents complex, 0 to 8 percent	Low
UuC	Urban land-Udorthents complex, 8 to 15 percent	Low
W	Water	Low
WaA	Watchung silt loam, 0 to 3 percent slopes	High
WaB	Watchung silt loam, 3 to 8 percent slopes	High
WcB	Watchung silt loam, 3 to 8 percent slopes, stony	High
WdB	Watchung-Urban land complex, 0 to 8 percent slopes	High
WgB	Wheaton-Glenelg Complex, 0 to 8 percent slopes	Medium
WgC	Wheaton-Glenelg Complex, 8 to 15 percent	Medium
WhA	Wiltshire silt loam, 0 to 3 percent slopes	High
WhB	Wiltshire silt loam, 3 to 8 percent slopes	High
WkB	Wiltshire-Urban land complex, 0 to 8 percent slopes	Low
WoA	Woodstown sandy loam, 0 to 2 percent slopes	Low
WoB	Woodstown sandy loam, 2 to 5 percent slopes	Low
WuB	Woodstown-Urban land complex, 0 to 5 percent slopes	Low

APPENDIX B

VEGETATIVE COVER TYPES AND HYDROLOGIC CONDITION

Table 2-2a Runoff curve numbers for urban areas [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area [2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands [1]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2]	Hydrologic condition [3]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

1 Average runoff condition, and I_a=0.2S

2 Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

3 Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4]	48	65	73
Woods—grass combination (orchard or tree farm). [5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.
2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.
3 *Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.
4 Actual curve number is less than 30; use CN = 30 for runoff computations.
5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.
6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

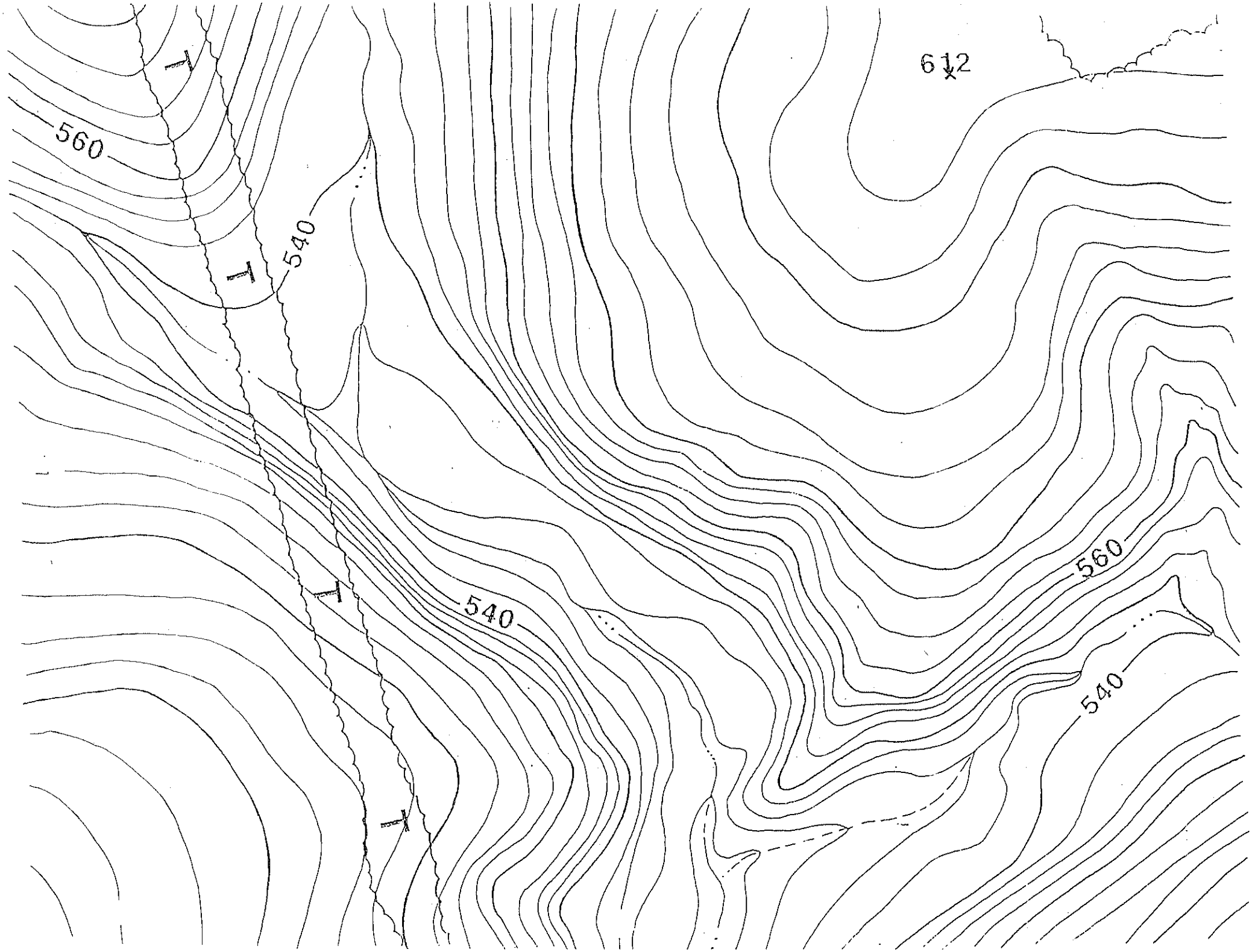
Table 2-2d Runoff curve numbers for arid and semiarid rangelands [1]

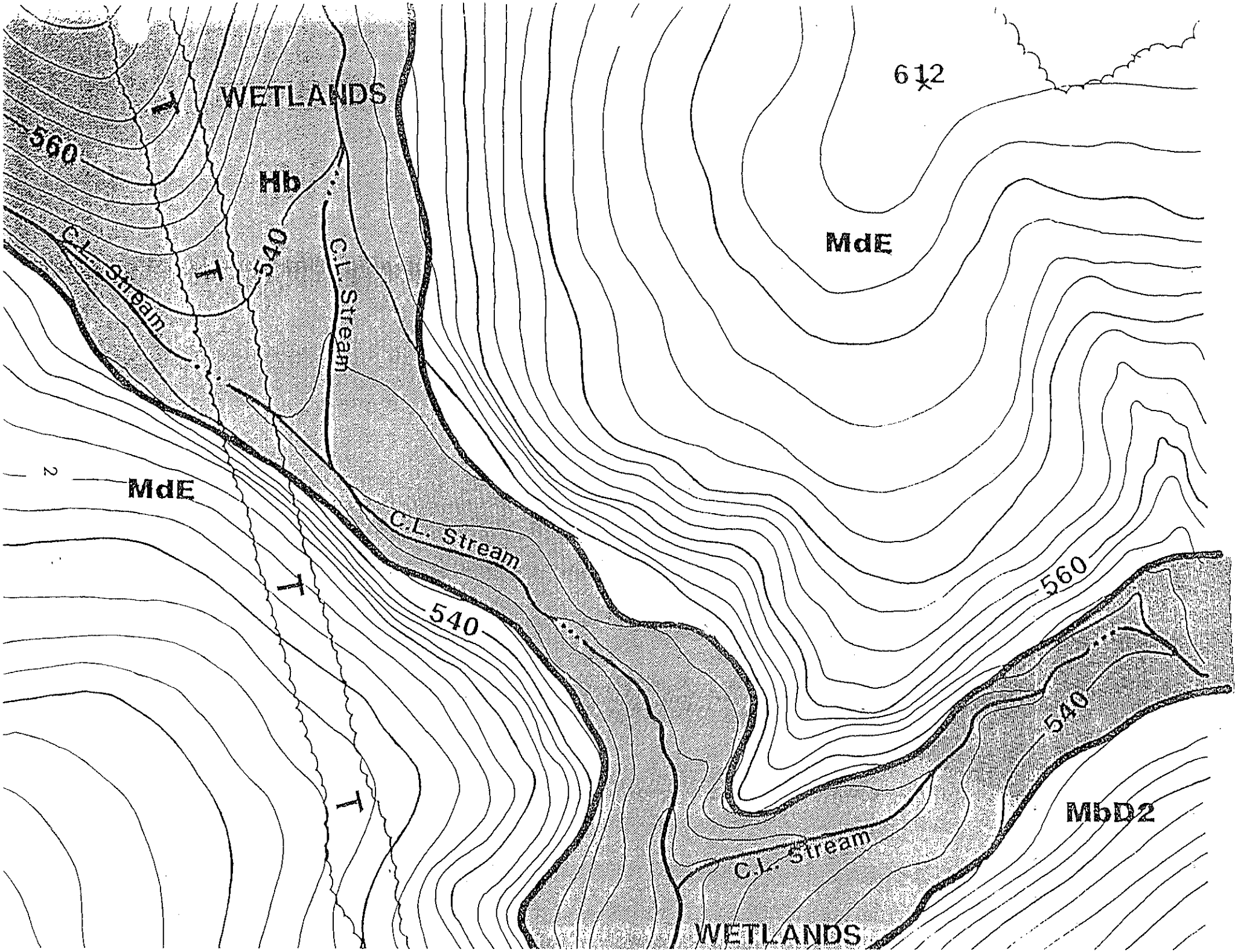
Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition [2]	A [3]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

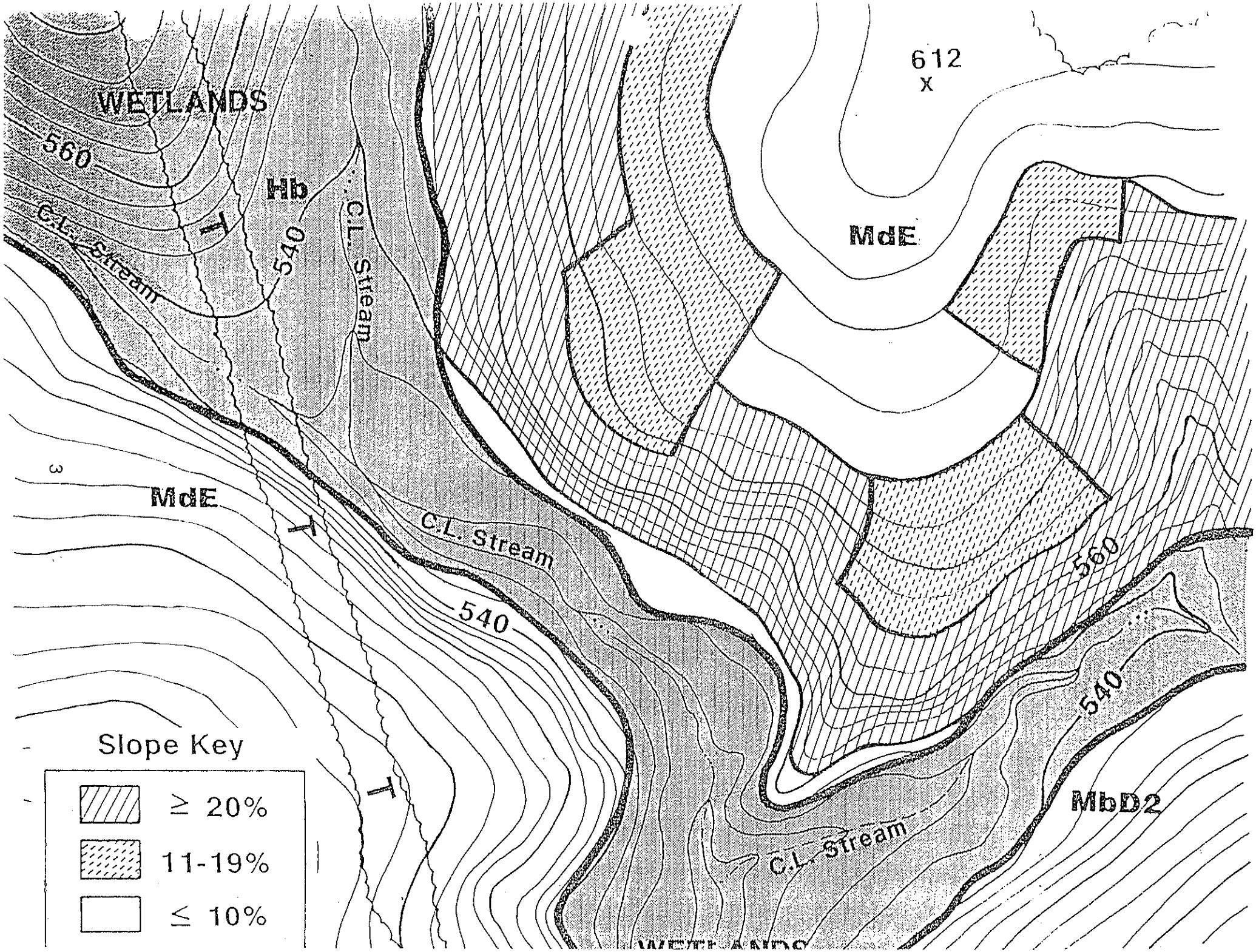
1 Average runoff condition, and $I_a = 0.2S$. For range in humid regions, use table 2-2c.
2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.
3 Curve numbers for group A have been developed only for desert shrub.

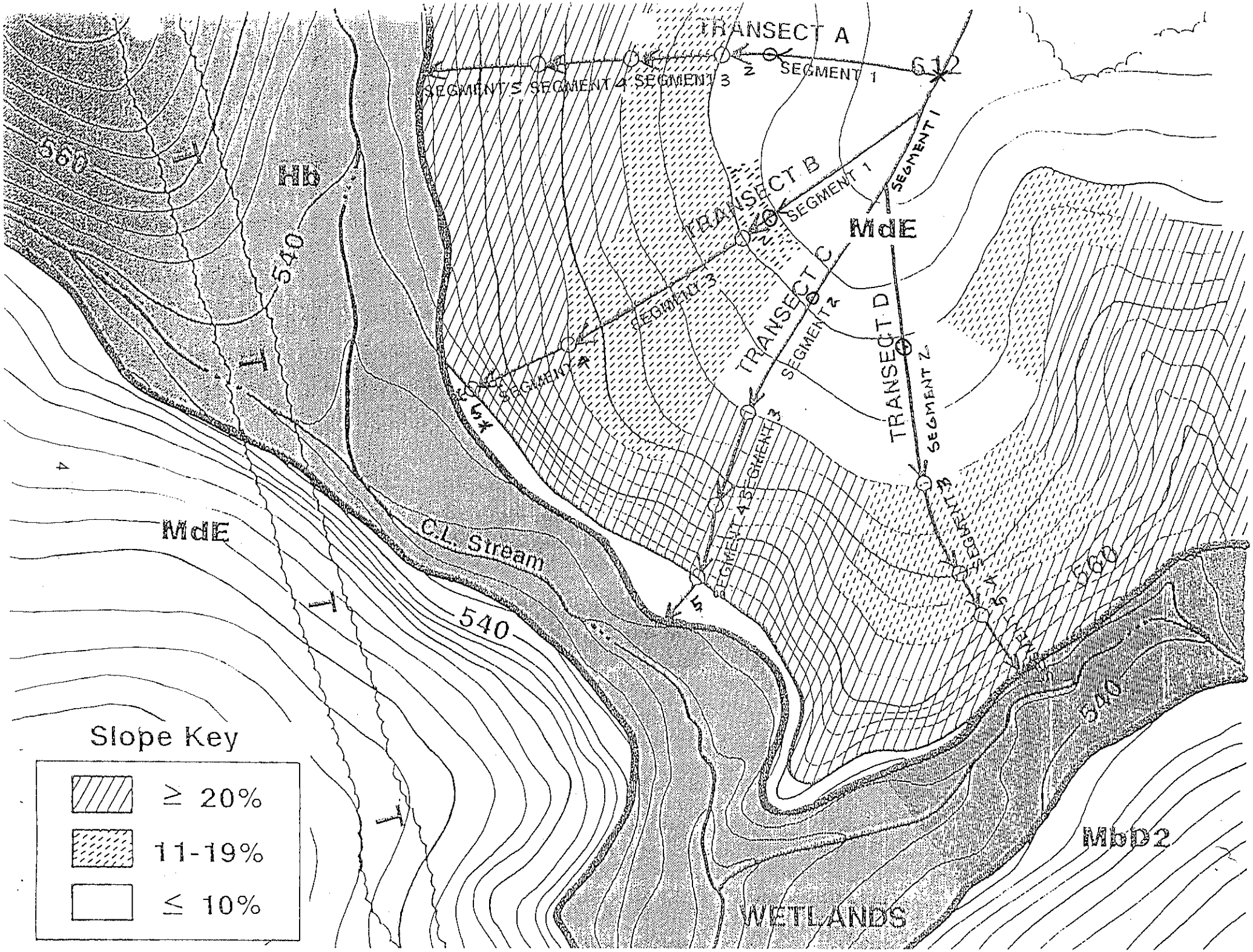
APPENDIX C

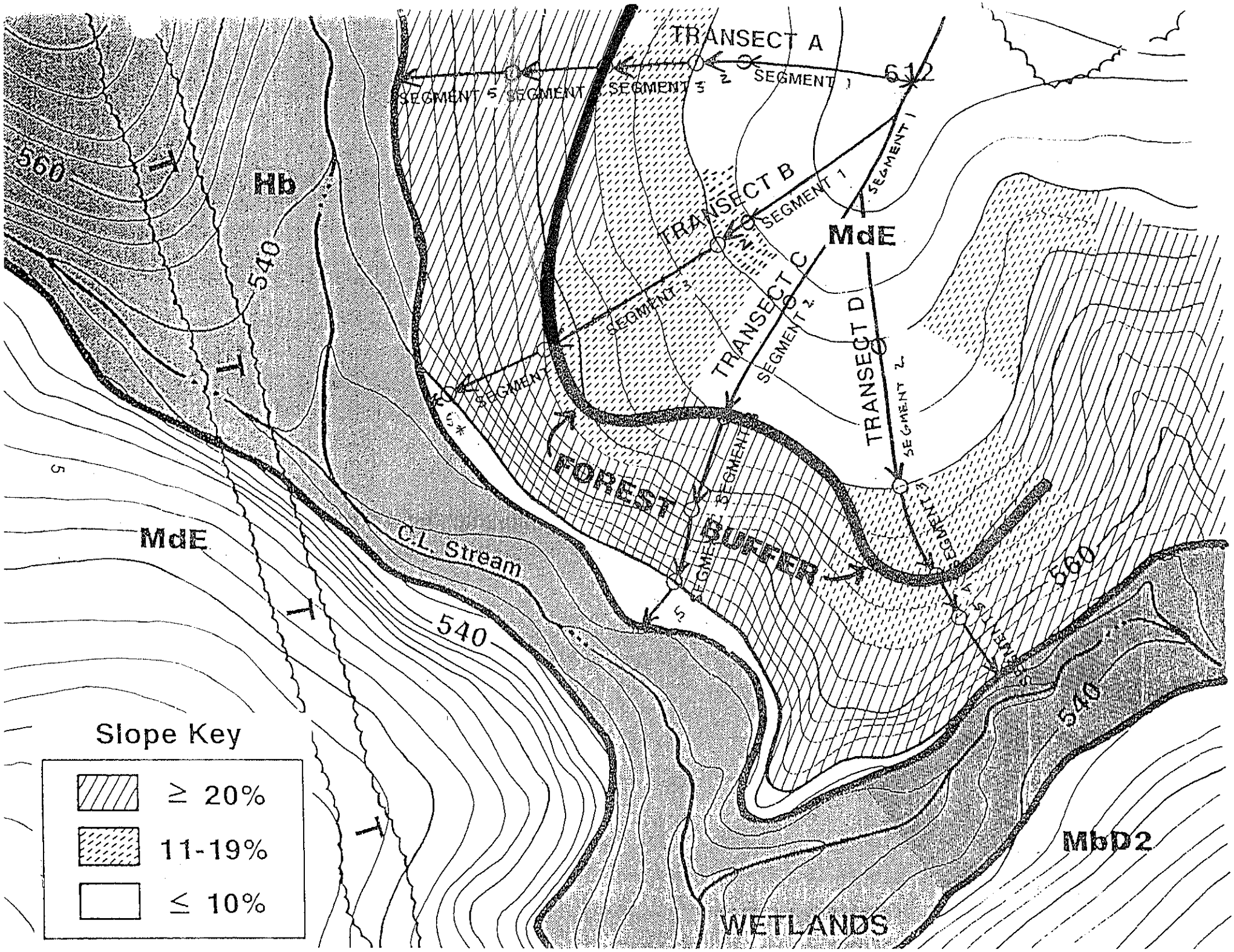
SAMPLE FOREST BUFFER ANALYSIS


612
560
540
540
560
540


WETLANDS
560
Hb
540
C.L. Stream
C.L. Stream
612
MdE
MdE
C.L. Stream
540
560
540
MbD2
C.L. Stream
WETLANDS


WETLANDS
560
Hb
540
C.L. Stream
C.L. Stream
612
X
MdE
MdE
C.L. Stream
540
560
540
MbD2
C.L. Stream
Slope Key
≥ 20%
11-19%
≤ 10%


TRANSECT A
SEGMENT 1
SEGMENT 2
SEGMENT 3
SEGMENT 4
SEGMENT 5
TRANSECT B
SEGMENT 1
SEGMENT 2
SEGMENT 3
TRANSECT C
SEGMENT 1
SEGMENT 2
SEGMENT 3
SEGMENT 4
TRANSECT D
SEGMENT 1
SEGMENT 2
SEGMENT 3
SEGMENT 4
SEGMENT 5
Hb
MdE
MdE
MbD2
C.L. Stream
WETLANDS
560
540
540
560
540
Slope Key
≥ 20%
11-19%
≤ 10%


TRANSECT A
SEGMENT 1
SEGMENT 2
SEGMENT 3
SEGMENT 4
SEGMENT 5
612
TRANSECT B
TRANSECT C
TRANSECT D
MdE
Hb
560
540
FOREST BUFFER
C.L. Stream
WETLANDS
MbD2
Slope Key
≥ 20%
11-19%
≤ 10%

TRANSECT: A

SEGMENT:	1		2	
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope	6 %	0	6 %	0
Slope Length	14.5	5	18.5	5
SEI	HIGH	10	HIGH	10
Cover	FOREST (G)	0	FOREST (G)	0
Sediment Delivery	300	0	260	5
Total Score		15		20

SEGMENT:	3		4	
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope	12.5 %	5	21%	10
Slope Length	265	10	345	10
SEI	HIGH	10	HIGH	10
Cover	FOREST (G)	0	FOREST (G)	0
Sediment Delivery	180	5	100	5
Total Score		30		35

SEGMENT:	5			
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope	25%	10		
Slope Length	44.5	10		
SEI	HIGH	10		
Cover	BARE SOIL	10		
Sediment Delivery	0	10		
Total Score		50		

SEGMENT:				
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope				
Slope Length				
SEI				
Cover				
Sediment Delivery				
Total Score				

SEGMENT:				
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope				
Slope Length				
SEI				
Cover				
Sediment Delivery				
Total Score				

TRANSECT: B

SEGMENT:	1		2	
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope	6%	0	12%	5
Slope Length	197	5	225	10
SEI	HIGH	10	HIGH	10
Cover	FOREST (G)	0	FOREST (G)	0
Sediment Delivery	300	0	212	5
Total Score		15		30

SEGMENT:	3		4 *	
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope	15%	5	37%	10
Slope Length	397	10	497	10
SEI	HIGH	10	HIGH	10
Cover	FOREST (G)	0	BARE SOIL	10
Sediment Delivery	100	5	0	10
Total Score		30		50

SEGMENT:	5 *			
FACTOR:	VALUE	SCORE	VALUE	SCORE
~~Slope~~	* ANOMALOUS			
~~Slope Length~~	INCORPORATE INTO			
~~SEI~~	SEGMENT 4 PER			
~~Cover~~	APPENDIX D, 3(a)			
~~Sediment Delivery~~				
Total Score				

SEGMENT:				
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope				
Slope Length				
SEI				
Cover				
Sediment Delivery				
Total Score				

SEGMENT:				
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope				
Slope Length				
SEI				
Cover				
Sediment Delivery				
Total Score				

TRANSECT: 6

SEGMENT:	1		2	
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope	6%	0	8%	0
Slope Length	220	10	335	10
SEI	HIGH	10	HIGH	10
Cover	FOREST (G)	0	FOREST (G)	0
Sediment Delivery	300	0	185	5
Total Score		20		25

SEGMENT:	3		4	
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope	24%	10	43%	10
Slope Length	420	10	485	10
SEI	HIGH	10	HIGH	10
Cover	FOREST (G)	0	FOREST (G)	0
Sediment Delivery	100	5	35	10
Total Score		35		40

SEGMENT:	5			
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope	10%	0		
Slope Length	520	10		
SEI	HIGH	10		
Cover	BARE SOIL	10		
Sediment Delivery	0	10		
Total Score		40		

SEGMENT:				
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope				
Slope Length				
SEI				
Cover				
Sediment Delivery				
Total Score				

SEGMENT:				
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope				
Slope Length				
SEI				
Cover				
Sediment Delivery				
Total Score				

TRANSECT: D

SEGMENT:	1		2	
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope	5%	0	6%	0
Slope Length	245	10	365	10
SEI	HIGH	10	HIGH	10
Cover	FOREST (G)	0	FOREST (G)	0
Sediment Delivery	300	0	180	5
Total Score		20		25

SEGMENT:	3		4	
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope	12.5%	5	19%	5
Slope Length	445	10	485	10
SEI	HIGH	10	HIGH	10
Cover	FOREST (G)	0	FOREST (G)	0
Sediment Delivery	100	5	60	10
Total Score		30		35

SEGMENT:	5			
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope	50%	10		
Slope Length	545	10		
SEI	HIGH	10		
Cover	BARE SOIL	10		
Sediment Delivery	0	10		
Total Score		50		

SEGMENT:				
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope				
Slope Length				
SEI				
Cover				
Sediment Delivery				
Total Score				

SEGMENT:				
FACTOR:	VALUE	SCORE	VALUE	SCORE
Slope				
Slope Length				
SEI				
Cover				
Sediment Delivery				
Total Score				

APPENDIX D

CLARIFICATION OF ISSUES RELATIVE TO THE APPLICATION OF THE METHODOLOGY

ISSUES RELATIVE TO THE APPLICATION OF THE METHODOLOGY FOR EVALUATING STEEP SLOPES AND ERODIBLE SOILS ADJACENT TO WATERCOURSES AND WETLANDS

The following discussion is intended to clarify sections of the Methodology that have been misinterpreted and to respond to the most often asked questions regarding its application. It is hoped that this will assist the users of the Methodology by providing a consistency of interpretation and uniformity in application.

1. Uniform Conditions within 100' of the Resource

"Since uniform conditions within 100' of the resource do not result in segmentation, slopes with uniformly good conditions are treated the same as slopes with uniformly poor conditions."

References to uniformly good, moderate, or poor conditions are misleading. While the physical characteristics of a particular slope (i. e., %slope, slope length, erodibility factor, etc.) may be consistent over that segment, there is no justification to assume that each characteristic would score the same when the segment is analyzed. Nor is there reason to assume that if some of the characteristics score low, they are sufficient to offset the potential problems associated with characteristics that score high.

The examples presented demonstrate that all possible scenarios share two characteristics that are consistent and problematic. The 100' segment is immediately adjacent to the resource, hence the high score for sediment delivery. Also, there is no vegetative cover downslope to buffer the resource, resulting in a high score for vegetative cover. There are a few examples where the low or moderate scores of the other characteristics begin to compensate for the significant consequences of being so close to the resource. Unfortunately, these situations are relatively rare. However, note that although the slope is flat and soil erodibility is low, a long slope length, lack of a vegetative buffer, and proximity to the resource result in a total transect score that is in the moderate range. The situation worsens as slopes and erodibilities increase with the Moderate and Poor Condition scenarios.

The point of this discussion is that situations where uniform conditions within 100' of the resource which do not present the potential for problems, are either relatively uncommon or, at best, present a moderate potential for impacts that must be addressed. The more common scenario is a high potential for increased runoff, erosion and sedimentation. With this in mind, there is no reason to modify the evaluation guidelines to accommodate relatively rare situations, nor to compromise resource protection where conditions warrant concern.

EXAMPLES OF UNIFORM CONDITIONS WITHIN 100' OF RESOURCE

Uniformly Poor Conditions

	Ex. 1		Ex. 2		Ex. 3	
Slope	20%	10	20%	10	20%	10
Slope Length	250'	10	100'	5	49'	0
SEI	High	10	High	10	High	10
Cover	bare	10	bare	10	bare	10
Sediment Delivery	0'	10	0'	10	0'	10
Total Score		50		45		40

Uniformly Moderate Conditions

	Ex. 1		Ex. 2		Ex. 3	
Slope	15%	5	15%	5	15%	5
Slope Length	250'	10	100'	5	49'	0
SEI	Medium	5	Medium	5	Medium	5
Cover	bare	10	bare	10	bare	10
Sediment Delivery	0'	10	0'	10	0'	10
Total Score		40		35		30

Uniformly Good Conditions

	Ex. 1		Ex. 2		Ex. 3	
Slope	8%	0	8%	0	8%	0
Slope Length	250'	10	100'	5	49'	0
SEI	Low	0	Low	0	Low	0
Cover	bare	10	bare	10	bare	10
Sediment Delivery	0'	10	0'	10	0'	10
Total Score		30		25		20

2. Transects to Ridgeline vs. Highest Point On Site or Off Site

This issue was discussed in considerable detail at several presentations to the industry. The key points of clarification were:

a. The transect should not be viewed as a T_c path but rather as a one-dimensional representation of a cumulative physical process that occurs in three dimensions (depth, width, and length).

   Precipitation that accumulates on the broad crest of a hill spreads laterally and flows downslope in a variety of directions. Precipitation falling on all points of the slope combines with runoff from upslope areas. This flow increases in depth and areal extent as it moves downslope away from the crest and drains an increasingly greater upslope area.

   While it may be convenient to represent flow paths of stormwater as single lines that run perpendicular to the slope contours, in fact, flow can occur in either narrow concentrated rivulets or as sheet flow outside a well defined channel. In addition, changes in micro-relief can cause downslope flow to be diverted across slopes and around obstacles such as dense vegetation, woody debris, soil clods, rocks and boulders, etc. The soil erosion that occurs as a result of this runoff may be sheet erosion and occur uniformly across a slope, or may occur primarily in the concentrated rivulets as rill erosion. The first step in evaluating slopes is to recognize the fact that plotting transects to represent the flow of runoff down a slope is a simplification of a complex process.

b. Relative to the evaluation process, a transect should be plotted from the crest of the slope to the resource. The "crest of the slope" is defined as the highest or most distant point in a subdrainage area or along the boundary with adjacent subdrainage areas that would be expected to drain over the slope face being analyzed.

c. One major issue has been the tendency to carry "ridgelines" down to the resource. Referring to extremely low points along this ridge as "the crest," transects are plotted perpendicular to this line to keep slope length short. This is inappropriate and inconsistent with the Evaluation Guidelines.

3. Determining the Forest Buffer Limits When Intermediate Segments Have Scores Less Than 35

   The regulations and Evaluation Guidelines clearly state that slope segments with scores of 35 or greater shall be designated as part of the forest buffer and no development shall be approved in that segment. Segments with scores of 25 or 30 shall require the application of additional protective measures, but development is not prohibited and those segments are not part of the forest buffer.

However, practically speaking, sometimes intermediate segments with scores of 35 or greater may not be included in the forest buffer. This may be justified based on an evaluation of their location on the slope, and relevant characteristics of the segment in question and of adjacent segments (e. g., segment length, slope, erodibility, etc.).

Conversely, sometimes segments with scores lower than 35 may be incorporated into the forest buffer. This is justified as a means of addressing the additional protective measures requirements for moderate scoring segments. Where conditions warrant the inclusion of these segments, the decision is usually based on the segment's location on the slope, characteristics (e. g., segment length, slope, erodibility, etc.), and/or the presence of significant upslope segments with high scores.

A variance is required in order for intermediate segments scoring 35 to be excluded from the forest buffer. The number of situations requiring these determinations has increased significantly. Consultants utilizing computer assisted analysis and more detailed topography have produced forest buffer analyses that focus increasingly on micro-relief features, resulting in transects with numerous small segments. Some of these segments have been as small as five feet. This approach complicates the analysis and review, is difficult to verify, and adds little relevant information to the overall evaluation procedure.

In an effort to refocus the evaluation procedures on general characteristics and to provide criteria for these determinations, DEPS will view these micro-changes as "blips" or anomalies that do not warrant segment breaks. The term "blip" will refer to changes in percent slope or vegetation that would have resulted in segments with a length of 25 feet or less.

The following examples demonstrate how this concept applies to site specific situations.

a. <u>Slopes</u>

   In working along a transect, a change in percent slope that would result in a segment with a length of 25 feet or less is ignored. When a percent slope change occurs that would result in a legitimate segment (i. e., greater than 25 feet), the anomalous area is averaged into the overall percent slope for the segment in which it is included.

b. <u>Vegetation</u>

   In working along a transect, a change in vegetation that would result in a segment with a length of 25 feet or less is ignored. When a change in vegetation occurs that would result in a legitimate segment (i. e., greater than 25 feet), the anomalous area is treated as though

the vegetation were the same as the adjacent segment (upslope or downslope) that has the poorest vegetative cover.

4. Significant Change in Proximity to Resource

"The 25 foot minimum buffer is a real, demonstrable factor in resource protection and is a significant change in proximity. Segmentation at this boundary should be permitted."

The default minimum 25-foot wetland buffer is mandated by the state's non-tidal wetlands protection regulations, and is not related to Baltimore County's forest buffer analysis Methodology.

The Methodology defines a "significant change" for any particular factor (i. e., percent slope, slope length, soil erodibility, etc.) as one that results in a change in the category (i. e., high, medium, low) for that factor. For purposes of the Methodology, proximity to the resource is defined as "the distance from the bottom of the segment being evaluated to the resource (i. e., edge of wetland or top of streambank)." Table 1 in the Methodology was developed to clearly define categories for each factor. The table indicates that changes in sediment delivery categories occur when the distance from the resource exceeds 100 feet and again when it exceeds 300 feet. To suggest that a change from some distance less than 25 feet to a distance equivalent to 25 feet is a "significant change" is not supported by the evaluation criteria. Perhaps the most compelling argument against making a segment break at 25 feet from wetlands is that the 25-foot minimum buffer from wetlands is not a site condition which can be observed in the field.

5. Significant Change in Vegetative Cover

"Significant changes may now only occur where a change in score in Table 1 occurs. For example, changes from high quality meadow to high quality forest are not significant. The impact of this is fewer opportunities to create segments, resulting in larger buffers. Also, if forest equals meadow, why not permit mowing in buffers?"

The Methodology defines a "significant change" for any particular factor (percent slope, slope length, vegetative cover, etc.) as one that results in a change in the category (i. e., high, moderate, low) for that factor. This criterion has been in place since the inception of the Evaluation Guidelines and the Methodology, and has been clearly explained in these documents.

Page 26 of the Evaluation Guidelines indicates that " the reviewer assessing this factor would compare descriptions given (in the TR-55 Model table which includes cover type and hydrologic condition) with characteristics observed in the field, and then select the category which most accurately describes the vegetative cover (and hydrologic condition) of the undisturbed area downslope of the construction site." (Remember: It is assumed that the segment being evaluated would be cleared and graded.)

For purposes of the Methodology a change from high quality meadow to high quality forest would not be considered a significant change. The TR-55 Model indicates that the RCNs for meadow (good condition) and woods (good condition) are A/30, B/58, C/71, D/78 and A/30, B/55, C/70, D/77, respectively. In developing the categories for the Methodology, meadow (good condition) and forest (good condition) were considered roughly equivalent and therefore placed in the same category. On the other hand, RCNs for meadow in good condition (A/30, B/58, C/71, D/77) and for woods in poor condition (A/45, B/66, C/77, D/83) were not considered equivalent and therefore appear in different categories (Low and Moderate, respectively).

The fact that one may be looking for "opportunities to create segments" does not justify making breaks that are not legitimate. All segments must be created in accordance with the procedures outlined in the Methodology.

Relative to mowing buffers, the obvious response is to point out that buffers provide many functions, some of which would be severely compromised by mowing. The Methodology emphasizes a buffer's ability to decrease runoff, increase infiltration and reduce erosion and sedimentation of watercourses and wetlands. While these functions are best performed by both meadow and forest, others are not. For example, streamside shading, streambank stabilization by the deep root systems of trees, uptake of nutrients from subsurface flows, high quality allochthonous material inputs to headwater streams, habitat for riparian forest dwelling wildlife, etc. are all dependent on the presence of forest as opposed to meadow.

6. <u>Segmentation</u>

". . . Section 33-3-111(c)(2) states that slopes shall be segmented into sections based on slopes alone and that each segment shall be scored according to the other parameters of the analysis."

Section 33-3-111(c)(2) describes the minimum information that a plan submitted for review must include, indicating that various percent slope sections should be shown along with existing vegetation, soils, streams, wetlands, etc. It does not say that slopes should be segmented based on slope alone. It doesn't even imply this statement.

The plan preparation section of the Methodology describes the specifics of the segmentation process and clearly states that "significant changes in soil erodibility, vegetative cover, and proximity to the resource will require additional segmentation during the slope evaluation process." (Changes in slope length do not require segmentation).

7. Contiguous Sensitive Areas

"The forest buffer width shall be adjusted to include contiguous sensitive areas such as steep slopes and erodible soils, where development or disturbance may adversely affect water quality, streams, wetlands, or other water bodies."

It has been assumed that this infers that areas within the forest buffer shall include only sensitive areas that are contiguous to the resource or with other sensitive areas that are contiguous with the resource. It has been further assumed that in application of the forest buffer analysis, sensitive areas are found to be those areas whose score on the forest buffer analysis is 35 or greater.

In the regulations and Methodology, "contiguous sensitive areas" means slopes (not slope segments) contiguous to a stream and/or wetland that may be steep and/or erodible and therefore sensitive to disturbance. The forest buffer analysis does not require that an upslope segment with a score of 35 or greater be contiguous to a downslope segment with an equal or higher score, in order for the upslope segment to be included in the adjusted forest buffer.

There are cases where an upslope segment with a score of 35 or greater is separated by one or more segments with lower scores from the nearest downslope segment with a score of 35 or greater. In these cases, it has been the Department's position that the forest buffer extends to the top of the highest segment scoring 35 or greater. The applicant has the opportunity (through a variance request) to provide justification for decreasing the forest buffer to a downslope segment scoring 35 or greater.