RESOLUTION NO. 68-1995
RESOLUTION ADOPTING A SCENIC ROADS
MANUAL FOR SAN JUAN COUNTY

WHEREAS, San Juan County is served by a system of scenic rural roads, and

WHEREAS, it is important that we maintain the character of these roads, and

WHEREAS, we need to provide clear guidance to County employees and the Public on how to maintain this character, and

WHEREAS, the County Engineer has developed a manual based upon "Vermont Back Roads," and

WHEREAS, a public meeting was held on February 14, 1995 to discuss the manual, now therefore

BE IT RESOLVED the document titled "~~A Scenic Roads Policy for San Juan County~~ "SAN JUAN COUNTY SCENIC ROADS MANUAL" is hereby adopted as a policy guideline for the development of all public roads in San Juan County.

ADOPTED this 27th day of June, 1995.

ATTEST:
Si A. Stephens, Auditor and
Ex-officio Clerk of the Board

By: Lillian Hamel
LILLIAN HAMEL - Deputy

Date: 6/27/95

APPROVED BY:
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Ron Loewen
Director/County Engineer

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SAN JUAN COUNTY
SCENIC ROADS MANUAL

A guide for the protection and enhancement of our rural roads' scenic qualities.

CONTENTS

ACKNOWLEDGEMENT

This document is a rewrite of the Vermont Backroad Guide published in 1974. It has been enhanced, updated and modified for San Juan County.

STATEMENT OF PURPOSE

San Juan County Roads

The roads of San Juan County mean much more to our citizens than simply a way to get from one place to another. Our county roads are part of the scenic element and rural character that should be preserved. To this end, San Juan County has prepared this road manual to characterize road design elements, maintenance guidelines and our over-all road philosophy.

The challenge to county personnel and road design professionals is to protect the rural scenic quality of island roads and at the same time provide public roads that are safe for the levels and types of traffic that use them.

This manual is designed to provide the underlying philosophy to guide the County and other road professionals as well as the general public in formulating ongoing construction and maintenance programs.

San Juan County Commissioners
March 1995

INTRODUCTION

One of San Juan County's most valuable resources is the scenic quality of its rural landscape. The attractiveness is derived from a variety of elements which compose its land use pattern. Open fields, wooded uplands, shorelines, farms, villages, and other natural and man-made features provide a visually rich environment for its residents.

An integral scenic element of the rural countryside is the County road system. These by-ways are characterized by narrow roadways with diverse and contrasting features in close proximity. These characteristics provide a unique visual experience when traveling through the rural landscape. The details of color, texture, and form are easily recognized. Combined with a sequence of apertures in the roadside canopy, there exists an intimacy and awareness of the landscape not obtainable on higher speed roads.

The value of our County roads is found in the unique visual experience they offer. The appeal to a large tourist population accounts for a substantial portion of the County's economy. It is from the County road system that the majority of visitors view the Islands. These roads further define the rural character of the islands, many of them beginning as farm to market or farm to dock roads.

Some of San Juan County's roads have been widened, straightened, paved, or otherwise "improved" to accommodate increased traffic or safety concerns. Often, these modifications have caused changes to environmental features and in turn have degraded the scenic, and cultural

values associated with a rural road. Such occurrences usually resulted from an inability to balance safety issues with the scenic qualities inherent to rural roads. Degradation also occurs because the standards and specifications which presently guide these modifications often do not consider the relationship of the rural road to the surrounding features of the landscape.

This guide was prepared with these concerns in mind. Its purpose is to set forth basic guidelines and examples which will be helpful for the protection, conservation, and enhancement of the scenic quality of San Juan County's rural roads. The guide emphasizes that aesthetic criteria and engineering requirements can be mutually beneficial. The goal of these guidelines is to implement rural road modifications which provide user safety, long range reduction of maintenance costs, and a roadway that is attractively integrated with the roadside and surrounding landscape. When planning and implementing modifications to a county road, not all of the guidelines may be appropriate for every situation. The County Engineer and staff will need to consider other alternatives and proceed with modifications with the public's safety in mind.

I. PLANNING CONSIDERATIONS

It is very important to carry out planning as an initial phase of work preceding modification to a county road. During this time, all factors which can influence the type and extent of modification should be given consideration. This includes identification and evaluation of 1) operational requirements, 2) social factors, 3) scenic features, and 4) user safety. Modifications based on an integration of these factors will lead to an improved county road that is safe to travel, less costly to maintain, and visually attractive.

A. OPERATIONAL REQUIREMENTS

Modifications to the cross-section and alignment of a county road are quite often carried out to reduce maintenance costs, prevent road failure or provide a more efficient roadway for vehicular movement. To fulfill these purposes, the operational requirements of the roadway must be investigated. Answering the following questions will be useful in making the proper determinations:

1. Road Function

   - Does the road provide vehicular access to a neighborhood or major destination such as a village/town or ferry terminal?
   - Does the road provide only vehicular movement within a village?
   - What type of property access does the road provide? (limited, partial, full)
   - How many homes does it serve?

2. Traffic Characteristics

   - What are the existing and reasonably anticipated traffic volumes?
   - What type of vehicle will predominately use the road?
   - Must the road accommodate heavy trucks and school buses?
   - Will bicycles be using the road?

3. Travel Requirements

   - What is the safe and reasonable speed at which traffic should travel along the road?
   - Will the road require year-round maintenance?
   - Can the road be efficiently cleared of snow?

4. Maintenance

   - What kinds of major maintenance occur on the road?

- Are there perpetual maintenance problems that have not been solved or might affect design?
- Have there been drainage problems?

B. SOCIAL FACTORS

A further area of consideration during the planning phase is the identification and evaluation of social factors. While their effects may be thought of as being indirect, they can have a significant influence on county road modifications. Questions related to social factors are listed below:

1. Land Use

- What types of land uses are adjacent to the road? (residential, agricultural, commercial, others)
- Will modifications be compatible with these uses?
- Can the proposed modification be carried out within the limits of the right-of-way?
- What are probable changes in land use? (check comprehensive plan, zoning, and development trends)

2. Costs

- Can the modification be properly completed within the available budgeted funds? (avoid the "too much for too little" situation)
- Will a more modest and less expensive modification accomplish the same purposes?
- Will the benefits, including safety and mobility, justify the level of modification?
- What will maintenance costs be after a modification is completed? (improper grading, lack of erosion control, and inadequate drainage will result in high maintenance costs)

3. Multiple-Use

- What other activities use the right-of-way? (horseback riding, hiking, bicycling, cattle crossing and utilities)
- How will a modification affect these uses and can they be accommodated in another way within the right-of-way?

C. SCENIC FEATURES

The scenic quality of a county road is primarily related to the variety of landscape features which comprise the roadside and surrounding landscape. An objective of any modification should be to protect, conserve, and enhance these features. Therefore, an essential part of the planning phase will be to locate these features, recognize their scenic importance, and determine how they will affect or be affected by a modification. The following list of scenic features and related questions will be helpful in this process:

1. Vegetation

- What type of plants grow along the roadside? (ground covers, shrubs, trees)
- What affect will a proposed modification have on roadside vegetation?
- Can excessive removal of vegetation be avoided?
- Can scenic qualities be enhanced by planting or by thinning of unwanted vegetation?

2. Topography

- What type of terrain does the road travel through? (flat, rolling, steep)
- Are there interesting land forms? (gullies, hilltops)
- Can cut and fill slopes be kept to a minimum?
- Can the roadway and roadside be properly graded and drainage adequately provided?

3. Geology

- Are there unique geologic formations? (bedrock outcroppings, boulders, cliffs)
- What will be the influence of rock outcroppings?

4. Surface Water

- Do views of surface water bodies exist or can they be created? (lakes, ponds, rivers, streams, brooks, salt water estuaries, wetlands)

- Will natural drainage channels be affected?
- What measures will be required to protect streams and shorelines?

5. Unique Natural Areas

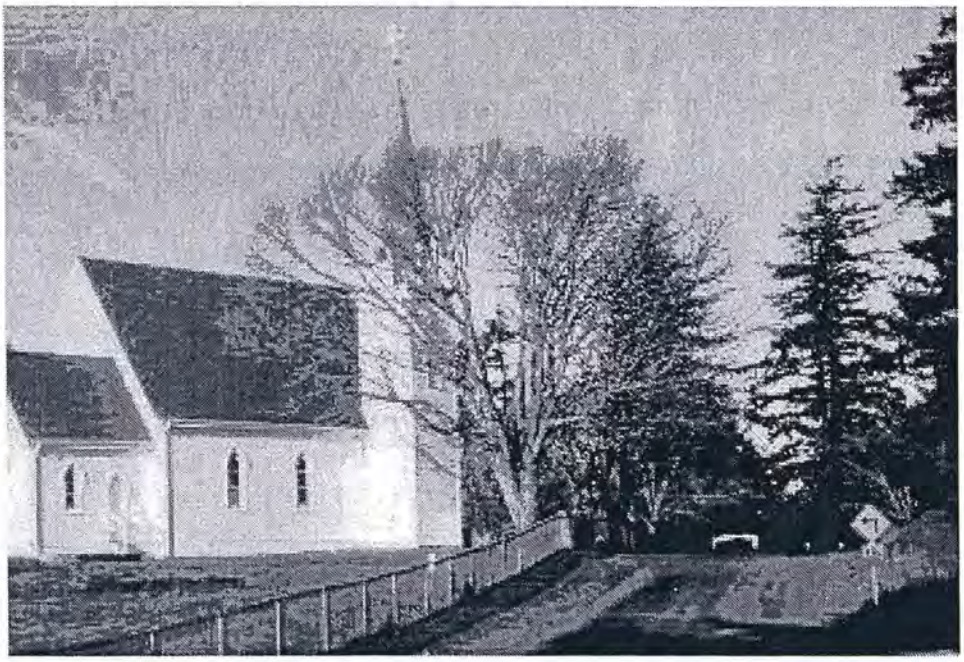
- Can views or enhancements of wetlands or salt water marshes be provided?

6. Wildlife

- What habitats exist along or near the road? (otters, eagles, salmon, trout, water fowl nesting areas)
- What effects will a modification have on these special areas?
- Is there potential for improving or establishing fish habitats?

7. Man-made Features

- What type of structures and activities typical of a rural landscape can be seen from the road? (farms, agricultural activity, grazing cattle, villages, bridges, houses, stonewalls, etc.)

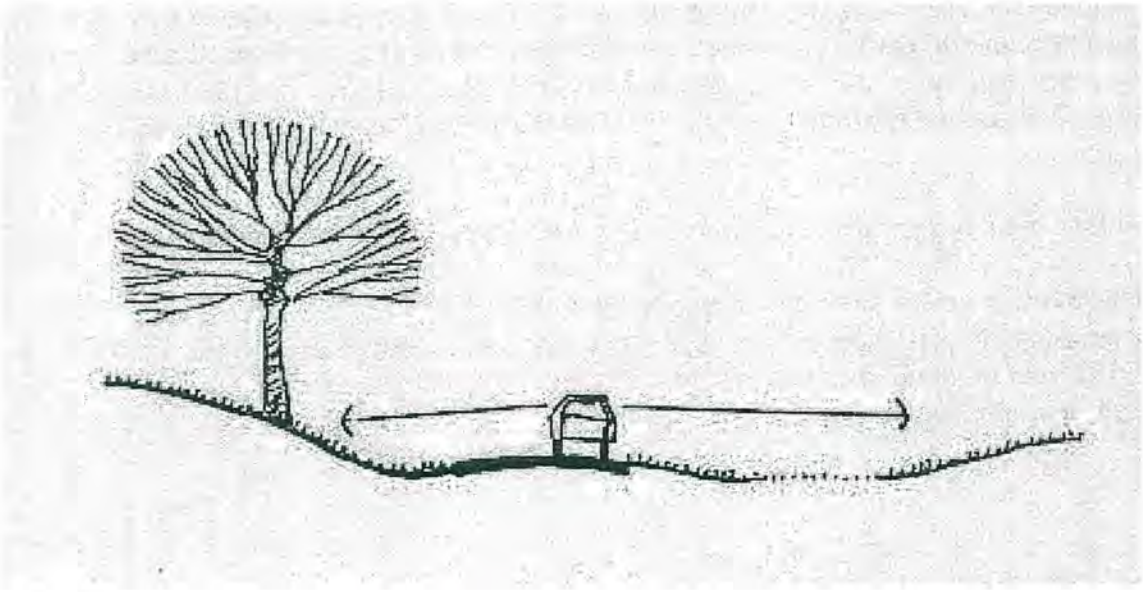


- Can the removal of important roadside structures such as stonewalls, be avoided? Can views of man-made features be enhanced?

8. Visual Qualities

- Are there features which provide visual diversity and contrast? (spring flowers, fall foliage, light and shade, openings in roadside vegetation, focal points)

- How does the location of the road affect views of scenic features? (foreground-detail, center, background-panoramic, position of viewer)



D. SAFETY

Modifications to County roads are usually pursued to provide a safer roadway for all users. Adequate attention must be given to current roadway features and past accident experience to insure all safety issues are addressed. Answering the following questions will be useful in making the proper determinations:

- What has been the number and severity of accidents over the past 5 years?
- What has been the cause of accidents along the roadway?
- Are there significant fixed objects adjacent to the roadway that need evaluation?
- Are there conflicts between pedestrians, bicycles or vehicles?
- Are there locations with inadequate sight distance such as driveways, road approaches or vertical and horizontal curves?

II. GUIDELINES FOR DESIGN, CONSTRUCTION, AND MAINTENANCE

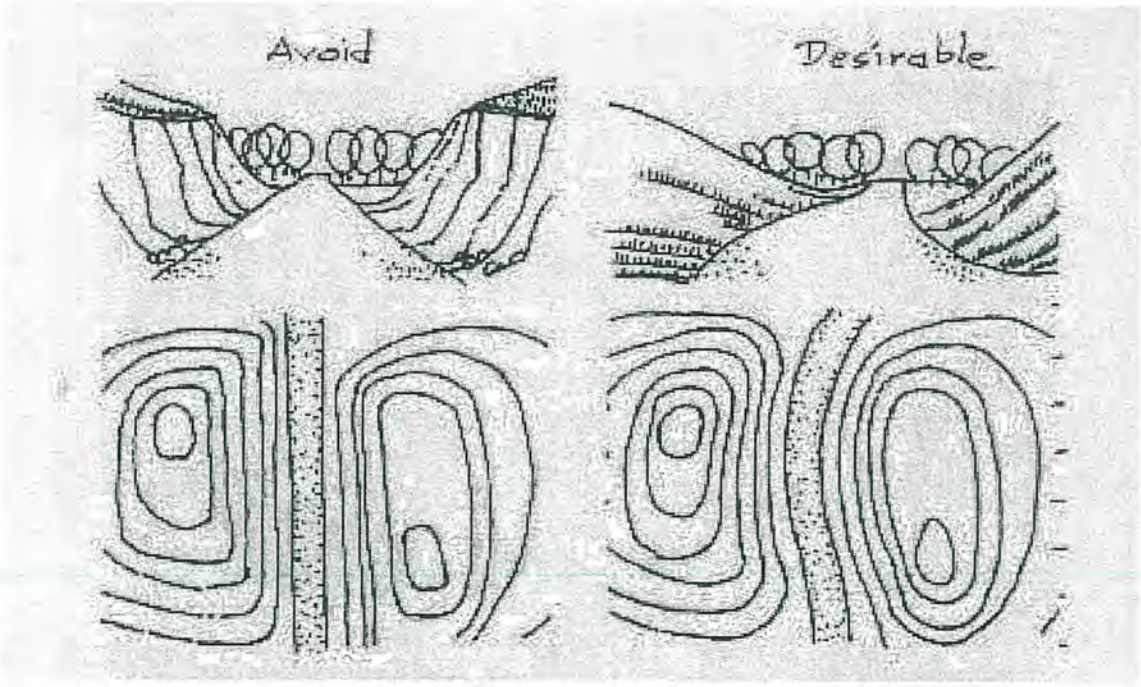
The guidelines set forth in this section stress the importance of protection, conserving, and enhancing the scenic qualities of a county road. They are also consistent with good engineering and the necessity to provide a roadway which is safe to travel and economical to construct and maintain.

A. RELATING ALIGNMENT TO THE LANDSCAPE

A unique visual quality of most county roads is the harmonious relationship their alignments have with the landscape. Increased volumes of traffic, poor sight distance, or other operational conditions may often necessitate modification of an existing alignment. If such a change is necessary, the roadway geometry usually must become more precise and directional. However, a new alignment should not be considered a straight line connecting two points. Rather, it should seek the same qualities of existing alignments by reinforcing and revealing the features of the landscape. The following guidelines will be useful for relating new alignments with the landscape:

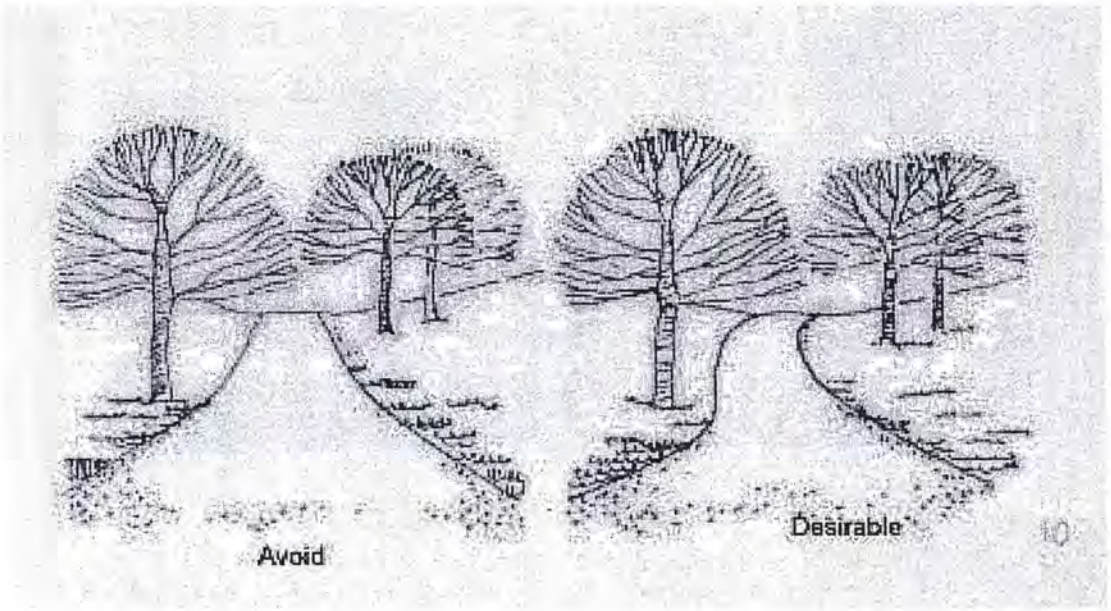
1. Choose an alignment which blends with the terrain and adjusts to important scenic features.

2. In most instances, the appropriate alignment will be characterized by curves which continually adjust to the rolling topography of natural landform. A curvilinear alignment is visually and functionally preferable to long tangents which cut through hillsides, leaving steep unsightly and unstable embankments.

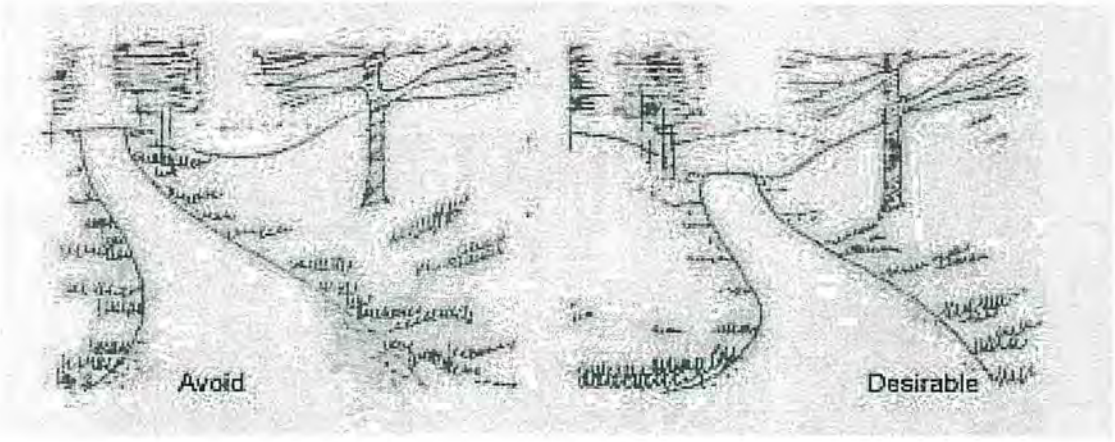

Avoid
Desirable

3. Where the land is level, or a strong lineal direction is created by landscape elements, such as a long row of trees or the patterns of fields, the use of a long tangent may be justified. When using a long tangent, try to direct it toward a natural or man-made focal point.

4. When climbing a hillside, the roadway should bend to the crest, traversing the contours, rather than climbing it straight on. However, care must be taken to avoid hiding a curve or driveway just beyond the brow of a hill.

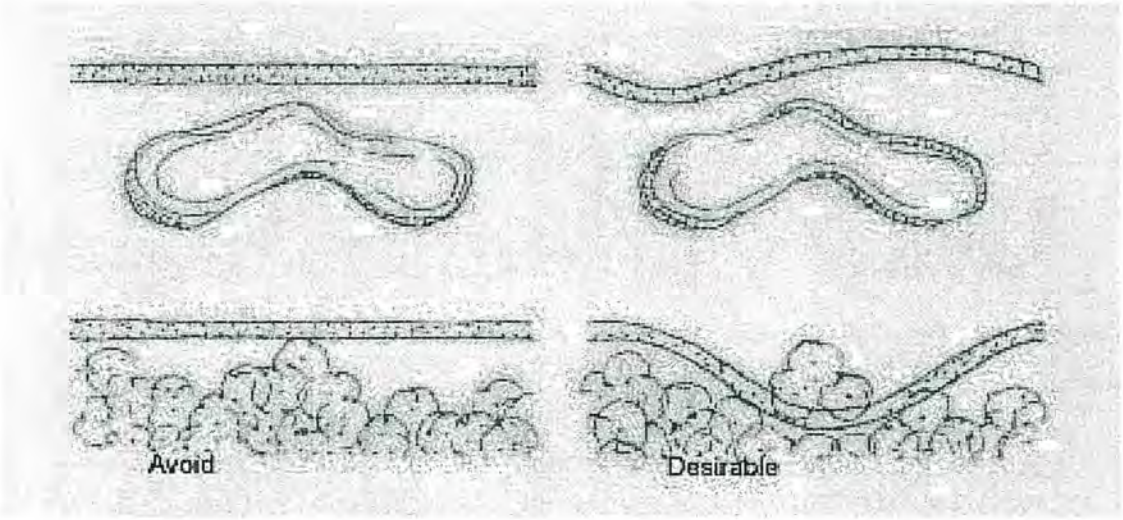


5. When crossing a ridge, pick a saddle or low area in the top to locate the roadway.



6. Natural and man-made features provide variety and contrast which maintain the traveler's interest. Whenever possible, alignments should be located to bring the more interesting features into view.

7. Near the edges of surface water, woods, or a break in topography, use alignments which echo or emphasize the shape of the edges. However, avoid moving roadways close to the waters edge as it destroys habitat.



8. When approaching important features, it is preferable to allow a distant view of the object, curve the alignment away, and then bring it close for a contrasting view.

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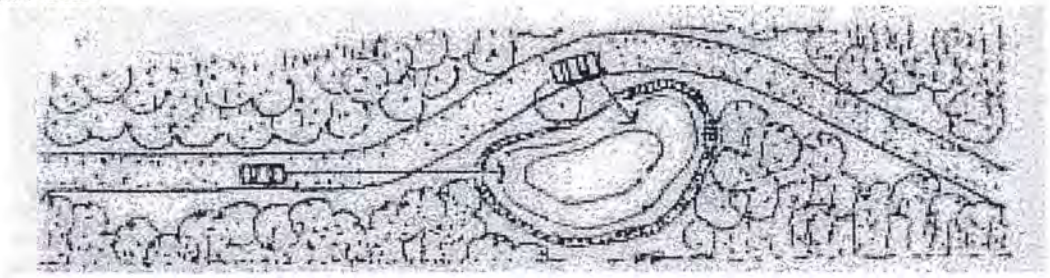
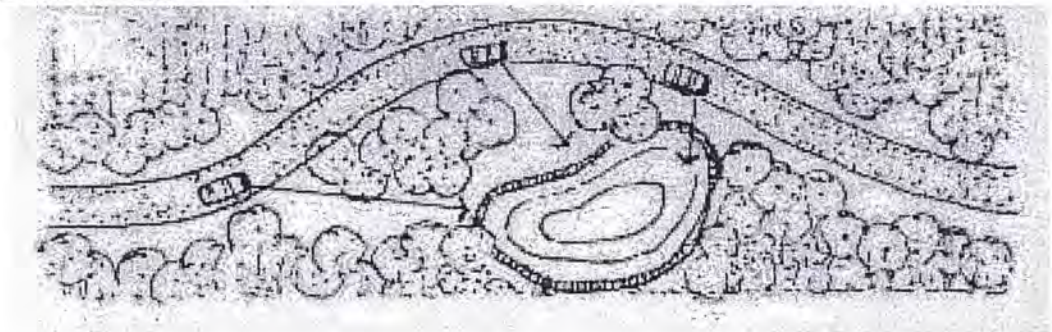


DESIRABLE



A road which blends with the form and pattern of the landscape is also desirable from the standpoint of construction and maintenance. Some of the advantages to be gained are:

1. Reduction of cut and fill quantities.

2. More efficient utilization of natural drainage channels.

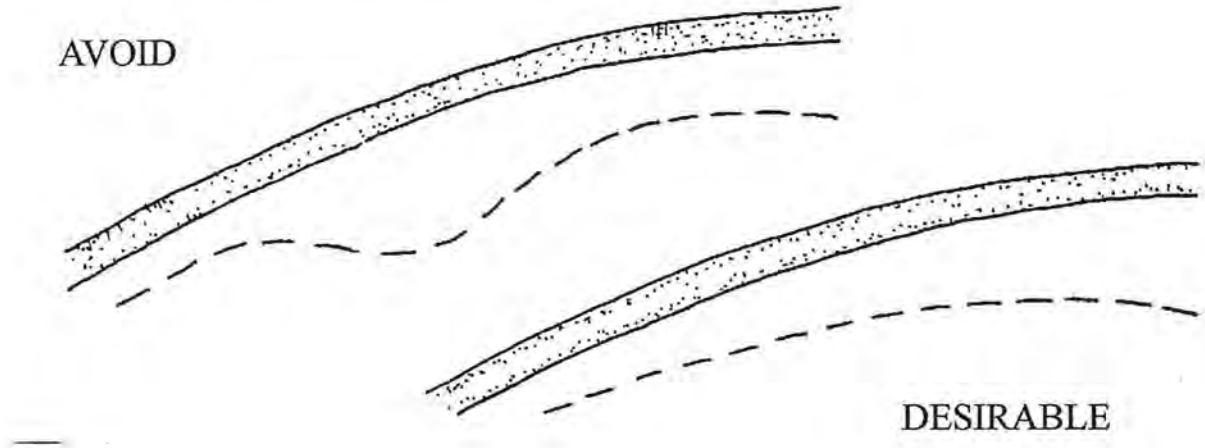
3. Better control of roadside erosion because natural vegetation is preserved.

B. COMBINING HORIZONTAL AND VERTICAL ALIGNMENTS

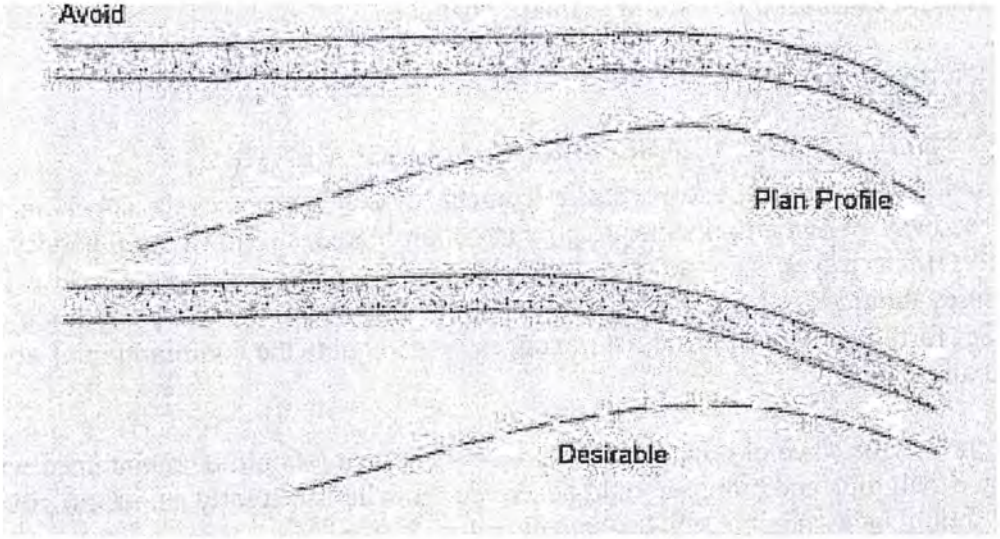
The combination of horizontal and vertical alignments closely influences the appearance and safety of a roadway. When alignments are properly coordinated, a roadway will be visually pleasing and safer to travel. Alignment coordination primarily applies to major roadways, but the basic principles should also be recognized as important considerations when altering minor roadways. Set forth below is a partial list of suggestions to guide the combination of horizontal and vertical alignments:

1. Consistency in the scale of horizontal and vertical elements should be maintained whenever possible. Small dips and humps should be avoided in what is actually a uniform grade, and "kinks" should be avoided in what is actually a long curve.

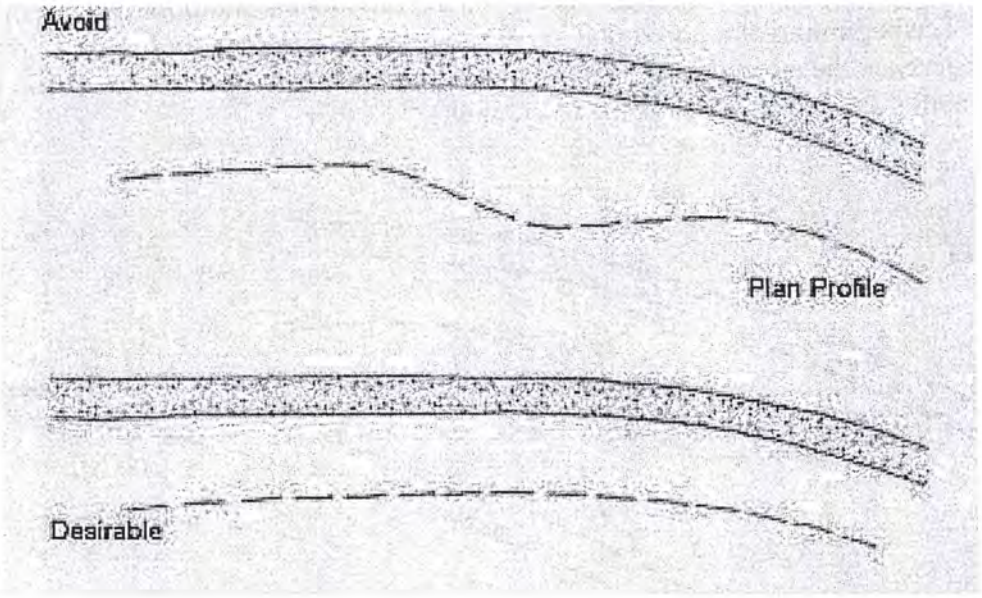
2. The beginning and ending of horizontal and vertical alignments should not occur in the same location. The beginning of a horizontal curve should generally occur before beginning a vertical curve and be somewhat longer in length. This provides a gradual transition between the alignments and prevents one from accentuating the other.



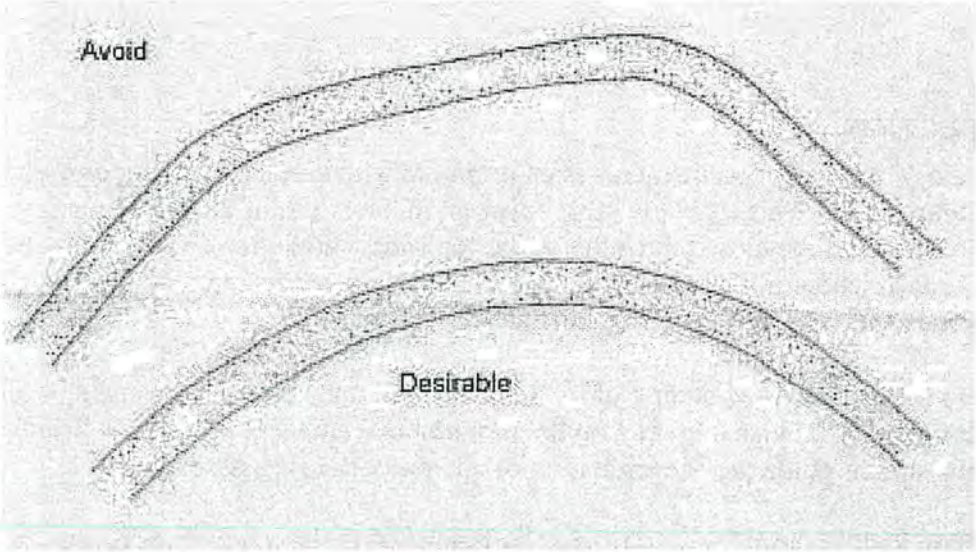
3. The beginning of a horizontal curve should not coincide with the top of a hill. This situation is visually deceptive and hazardous, as the quick change in horizontal alignment cannot be seen by the driver.



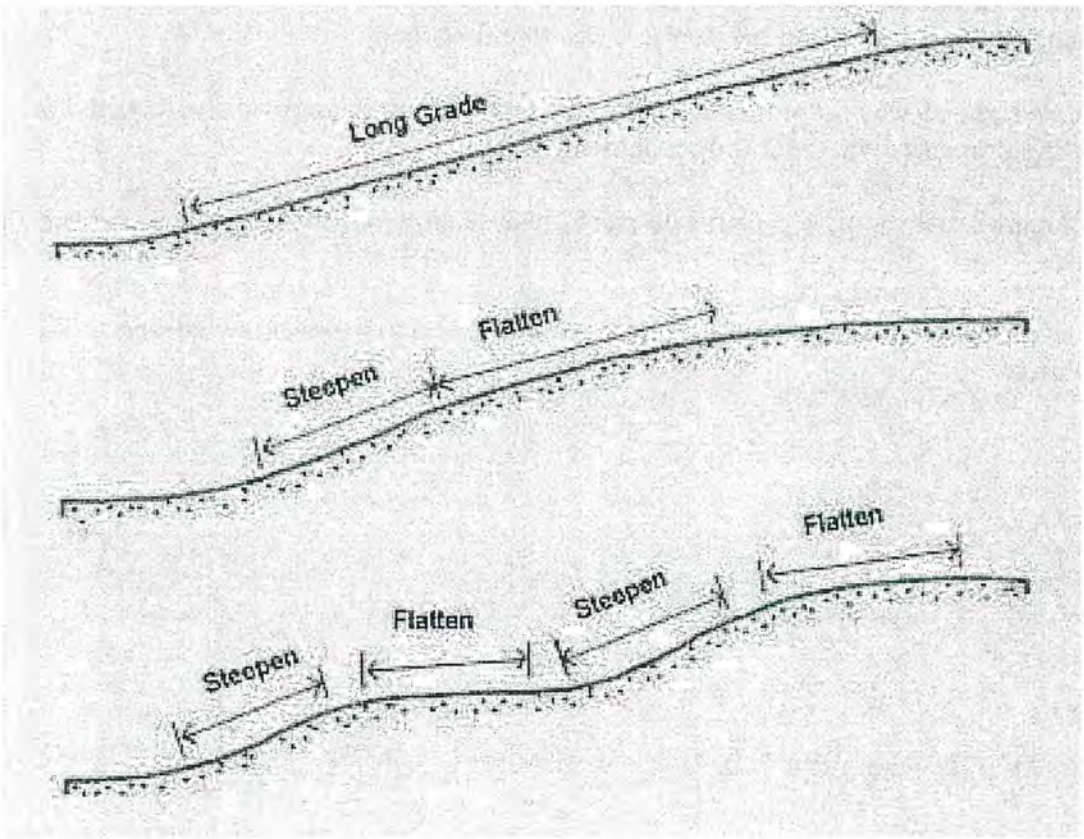
4. Avoid dips in vertical alignment before beginning a horizontal curve. This will prevent the roadway from appearing disjointed.



5. Avoid "broken back" curves (two horizontal curves in the same direction with a short tangent in-between).



6. When an extremely long grade is necessary, it may be better to adjust the vertical alignment so the grade is steeper near the bottom of the hill and gradually lessens as it approaches the crest of the hill. Another alternative is to create an alignment with intervals of lesser grades.



7. Sight distance requirements vary with the anticipated speed of vehicles. Adequate sight distance must be provided. This should be checked at all horizontal curves and crest vertical curves.

C. CROSS-SECTION

The small scale of cross-section elements is an important characteristic adding to the scenic quality of a county road. This aspect is most apparent in the width of the traveling surface, its adjacent shoulders, and the close proximity of the roadside. While these widths may be considered narrow, where traffic volumes are low, speeds are slow, and meeting and passing of vehicles is infrequent, they can perform adequately.

Modifications which require widening of the roadway will alter the existing scale of the county road and consequently its visual impact on the motorist and adjacent properties. The following considerations should guide the determination of an appropriate cross-section:

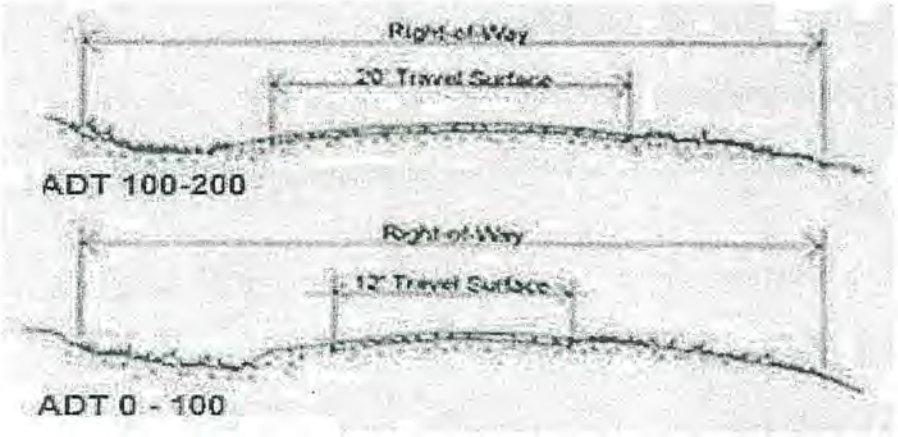
1. Appropriate widths should be determined by the function the road serves as part of the county road system, operational requirements for safe vehicular movement, and the characteristics of topography and other physical features (check results of planning considerations).

2. Consider all elements of the cross-section (traveling surface, shoulders, ditches, proper grading to stabilize cut and fill slopes, slope rounding, etc.).

3. Can the right-of-way accommodate the cross-section or will approvals be required from abutting property owners for proper construction?

4. Do not arbitrarily apply a specific standard cross-section to every classification of county road.

5. Avoid cross-sections which will result in excessive and unnecessary widening of the roadway.



Recommended widths for roadways with traffic volumes as shown. Higher volume roadways need additional evaluation.

D. PAVING

Over 204 miles of the County's 270 miles of roads have been paved. Typically a road with a vehicular volume of 300 to 400 vehicles per day should be considered for paving. At these volumes it becomes difficult and expensive to adequately maintain a gravel road.

Once a road is paved, it will probably never be returned to gravel surface. Since the possible consequences of this operation can have a major impact on the rural quality of a road, the decision to pave or not to pave should be based on a careful evaluation of all influencing factors.

The evaluation should consider the following points:

1. Does the volume and composition of traffic justify paving?

2. Will the initially high costs of construction be balanced by long term savings on the cost of maintenance?

3. Will paving only those stretches of roadway which are difficult be adequate?

4. Are abutting property owners supportive?

5. Is there a need to make geometric or cross-section changes?

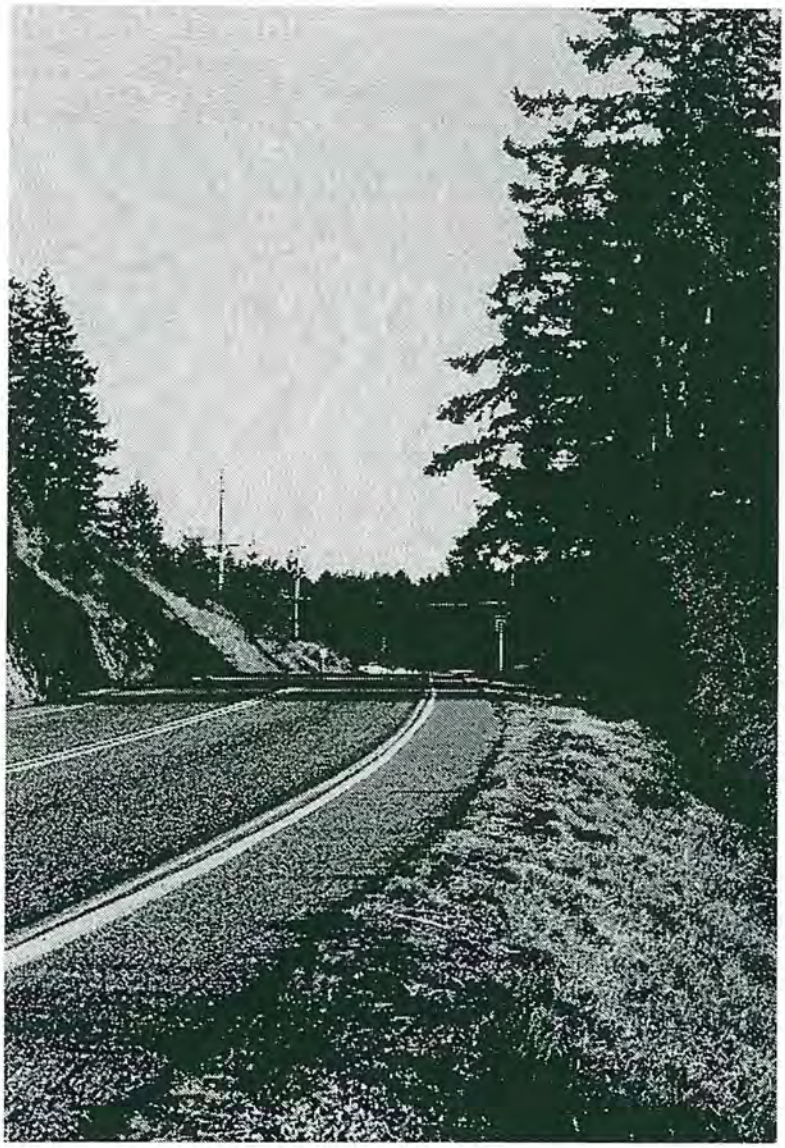
E. SHOULDER CONTRAST

If a roadway requires substantial widening and paving, extending the pavement across the full width of the shoulders should be avoided. The pavement should only extend across the width of the traveling surface with the shoulders providing a visual contrast. This delineation will help reduce the visual impact of a roadway's increased size and provide a more appropriate transition to the roadside. Also, it will add to traveling safety by clearly defining the limits of the traveling surface. Appropriate materials for achieving shoulder contrast in rural areas are discussed below:

1. Gravel or crushed stone shoulders offer good contrast to the bituminous pavement and do not require a great amount of maintenance.

2. Turf shoulders offer excellent contrast to a bituminous pavement and are quite fitting for the rural landscape. Grasses used to establish turf shoulders must be able to endure the effects of salt and compaction (salt comes from snow and ice removal).

3. Natural vegetation which may establish itself on the shoulders will fulfill the requirement of contrast and also provide natural variety in keeping with the character of our environment.



F. SHOULDER SECTIONS AND TURNOUTS

The shoulders of a county road are minor elements but serve three basic purposes. First, they provide lateral support for the traveling surface. Second, they provide a narrow extension of the traveling surface where vehicles can drive when meeting or in an emergency. Third, they provide an area for pedestrians, equestrians and bicycles.

Turnouts can provide a substitute for shoulders on lightly traveled roads or on higher volume roads, to use mailboxes, school bus stops, to observe wildlife, vistas, or at tops of hills for bicyclists to rest. Spacing these elements at appropriate intervals along the roadway can often be accomplished with little cost and greater conservation of roadside features.

Shoulder sections and turnouts should be located and designed in relationship to the following guidelines:

1. Locations should be clearly visible to the motorist.

2. Intervals between shoulder sections should not be spaced haphazardly, but rather in a fairly uniform sequence.

3. Relate locations to roadside terrain. Where the grade changes from cut to fill, suitable locations are often formed.

4. Wherever possible, locate turnouts at points where distant vistas or other interesting features such as scenic details exist.

5. Provide a gradual transition from the traveling surface to the shoulder section or turnout.

6. Avoid extremely short lengths of shoulder sections or turnouts.

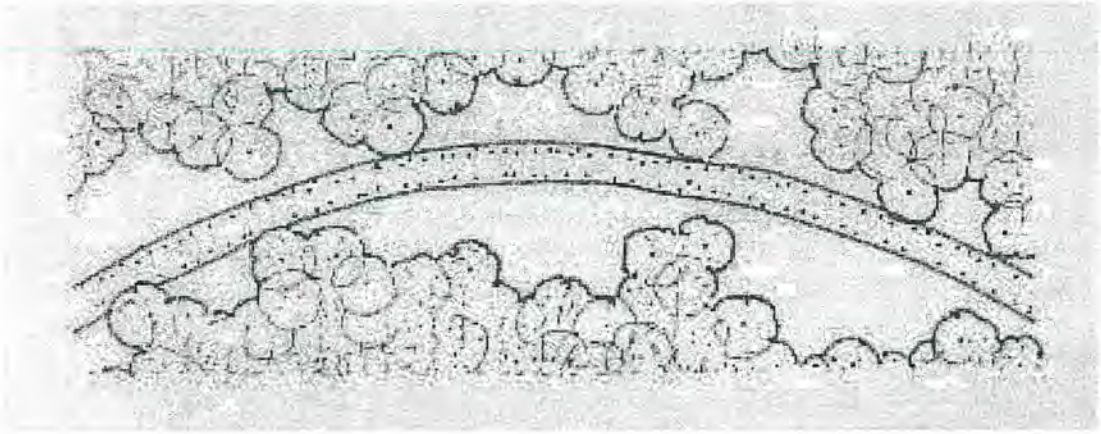
7. Design to accommodate the intended uses, mailboxes, bicycles, etc.

G. CLEARING AND GRUBBING

The narrow roadside area has a major influence on the scenic quality of a county road. It contains a variety of features which, because of their close proximity to the roadway, are extremely visible. Efforts to protect and conserve roadside features must begin at the earliest phases of construction. Therefore, it is important that the initial clearing and grubbing work be carried out in a manner which will maintain the diversity and contrast of natural features comprising a roadside. Following the guidelines set forth below will be helpful in achieving that objective:

1. The site of a project should only be cleared to the extent necessary for construction. When important vegetation is to remain it should be clearly marked and fenced if necessary.

2. Leave a woodland edge that is uneven and at varying distances from the roadway to avoid a straight-edged channel.



3. Important vegetation and other landscape features within the limits of construction that do not obstruct the construction operations should be conserved and protected from damage.

4. Wherever possible, and safety allows, specimen trees and other interesting vegetation growing in close proximity to the roadway should not be disturbed. The minimum setback from the traveled roadway should be ten (10) feet.

5. If widening needs to be carried out where large established trees or significant rock outcropping line the roadway, the alignment should be adjusted to one side or the other so only one row of trees or rock needs to be removed or disturbed.

6. Trees that require removal should be cut as close to the ground as possible and stumps removed.

7. A strip of grass or vegetation should be preserved along shorelines and stream banks to stabilize slopes and protect against erosion.

8. All debris and unusable waste materials resulting from the clearing and grubbing operation should be removed from the right-of-way.

9. Whenever the opportunity presents itself, roadways should be moved away from shorelines, wetlands, or residences.

H. REUSE OF NATURAL MATERIALS

During clearing and grubbing and rough grading operations there often exists an opportunity to salvage natural materials which can be effectively reused when restoring the roadside. The materials which should be considered for this purpose are discussed below:

1. Topsoil is the easiest and most commonly salvaged material. Acceptable topsoil should be stripped off and stockpiled. In later phases of grading it can be spread over areas to be seeded, or for use in planting.

2. Plant materials which require removal for construction possibly can be salvaged to be replanted at a later time. Small plants will be the easiest to remove and will have the best chance for survival. The roots of plants will need to be covered with a mulch and kept moist, but the visual effectiveness of natural plants in resorting the scenic quality of the county road may justify this care.

3. Stones and boulders can be reused to fulfill aesthetic and functional purposes. If field stones are found they should be reused as a more fitting material for headers at the end of culverts, as long as they are kept below shoulder elevation. Large boulders can be used as landscape features in the roadside or even in a nearby stream. Both stones and boulders can be used as rip-rap material for the stabilization of shorelines and the banks of streams or fill slopes.

4. Timber, gravel, and sand should always be considered for reuse, but the cost must be carefully analyzed to determine the feasibility of these operations.

I. GRADING

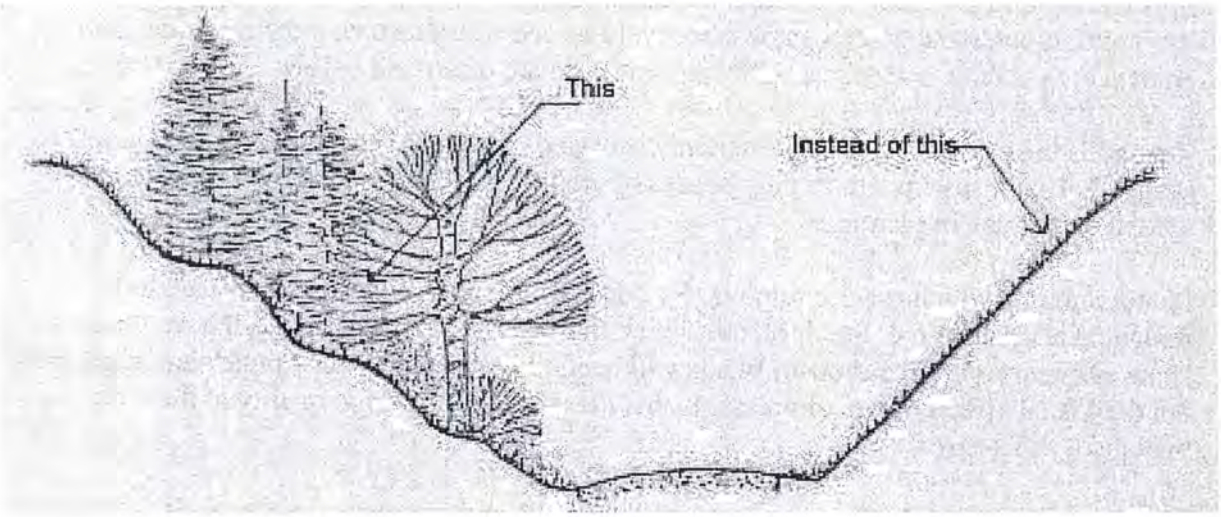
Proper molding of roadside slopes is essential during the grading operation. Slopes which do provide a smooth visual transition from the roadway to existing land forms have a pleasing appearance. Slopes shaped in this manner are also required for effective erosion control, adequate drainage, and reduced maintenance. Some general guidelines to follow when grading the roadside are set forth below:

1. Where the topography is flat to rolling and the landscape is open, slopes which are flattened and well-rounded are appropriate. Flattening of slopes to 4:1 (4 horizontal to 1 vertical) should be carried out.

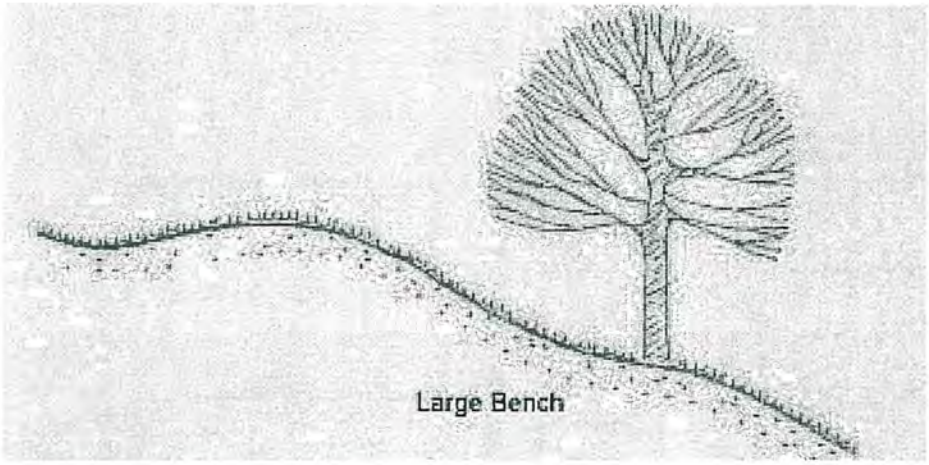
2. Where the topography is steep, uneven, and wooded, roadside slopes with grades of 2:1 of 3:1 should be favored to save roadside vegetation. However, check to make sure the slope is flat enough to be stable.

3. Vary the steepness of roadside slopes to save vegetation and other landscape features.

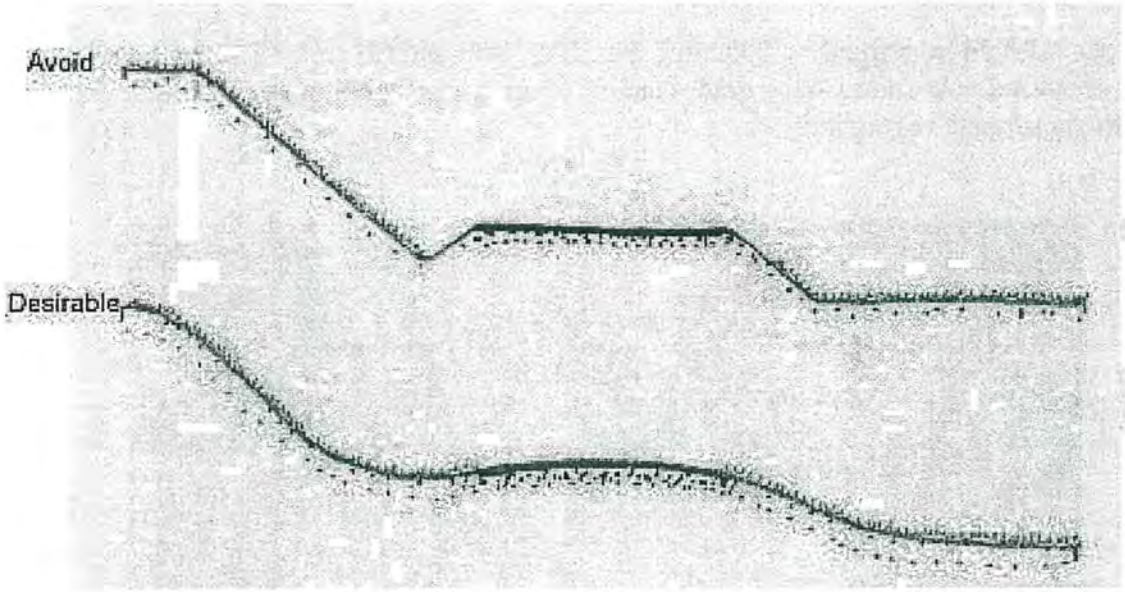
4. On areas of extreme cut, which may require easements or more right-of-way, the use of small benches, stepped down a steep slope, will slow water runoff and provide excellent locations where vegetation can quickly take hold. It is important to maintain a slight downhill pitch on these benches to provide adequate drainage.

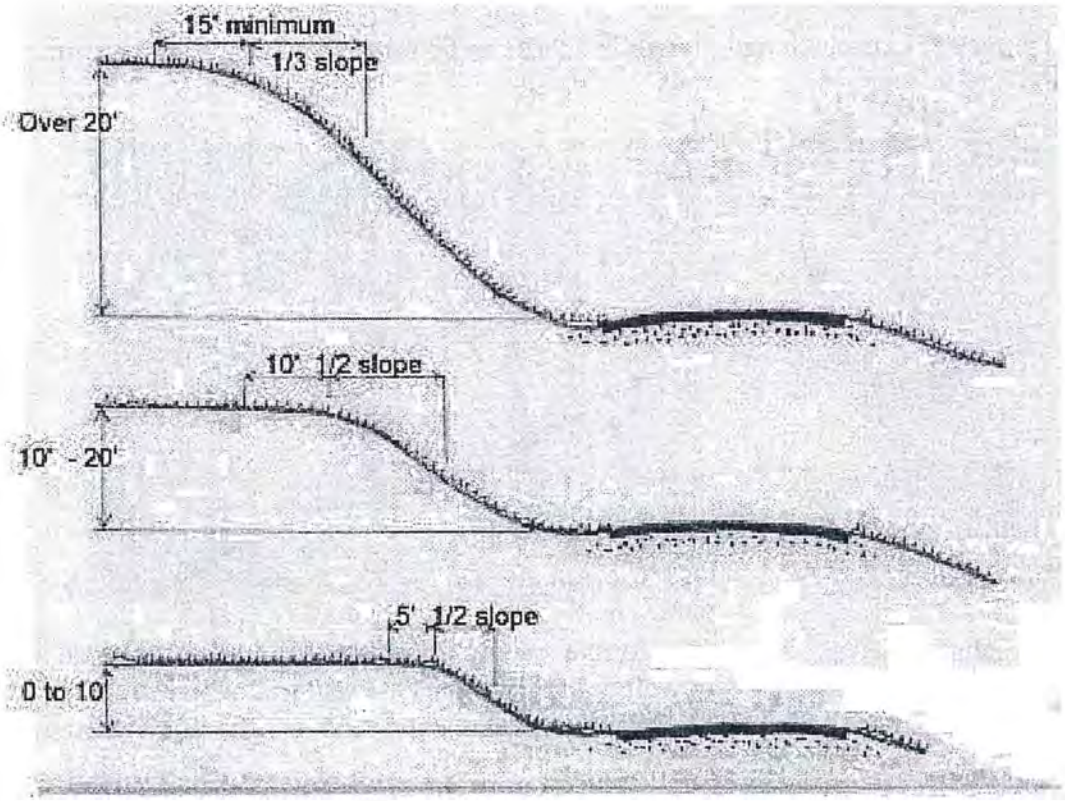


5. On fill slopes of extreme length, larger benches can be formed to fulfill the same functions as above.



6. All slopes should be well-rounded to form a smooth transition from the shoulder edge to the existing grades. Deep ditches with well defined bottoms are required where drainage or soils are poor. Rounded or shallow ditches are acceptable when there is little drainage and the soil is free draining.





7. All slopes should be warped by flattening the ends of cut and fill areas. This will avoid sharp breaks between new and existing grades and result in natural looking slopes which will more effectively support vegetation.

8. When grading the roadway, avoid disturbing important roadside vegetation and the creation of deep cuts which expose tree roots and leave steep banks that are susceptible to erosion and difficult to maintain.

J. DITCHES

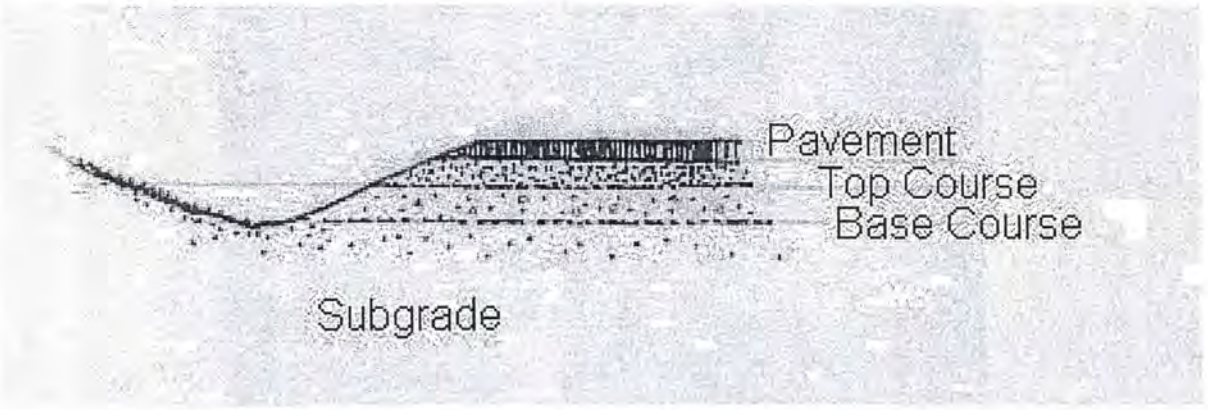
Ditches provide an important function in sustaining quality roads by providing adequate storm and subgrade groundwater drainage. However, excessively deep or wide ditches can severely impact vegetation, the rural feel of a road or safety. Several issues to consider when selecting a ditch section follows:

1. Slopes from the roadway to the ditch bottom should be at least 2:1 on lightly traveled roads and 3:1 or greater, on other roadways. The shallower pitches will allow for some vehicle recovery and less potential of a vehicle overturning on higher speed roadways.

2. Ditches should be deeper than the subgrade to allow drainage of rock material.

3. Where ditch construction may impact significant roadside features, short sections of culvert, curtain drains or shallow or no ditches at all should be considered.

4. Ditches must be constructed to adequately carry the anticipated water flow.



K. EROSION CONTROL

Effective control of erosion is necessary for a county road to be functionally stable, low in maintenance and visually pleasing. If measures to prevent erosion are not carried out, runoff will constantly scour slopes; forming channels and depositing soil in ditches and on the roadway. The result is unsightly and requires unneeded expenditure of time, effort, and cost to repair.

Control of erosion should start during the initial grading operations. Temporary measures to control erosion during construction include the following:

1. A rough surface on exposed slopes.

2. A mulch covering (if trees are being removed, investigate the feasibility of using a chipper for this purpose).

3. The use of checks, dams, berms, matting or other erosion control methods. Hay bales at the tow of embankments is an easy technique to prevent siltation of streams and fields.

Preservation and restoration of roadside vegetation is necessary for the long term control of erosion. Plants reduce the eroding capacity of water by cushioning the impact of rainfall and by holding the soil during times of surface runoff. The following considerations and guidelines will influence the use and type of plants for erosion control:

1. The size, steepness, and length of slopes are major factors to be considered.

2. A good seedbed is required to establish vegetation; topsoil, fertilization, and mulching may be necessary.

3. Seeding to produce a grass cover is the quickest and most commonly used method to deter erosion.

4. Slopes steeper than 2:1 or which do not support turf, should be planted with vines, ground covers, or other low growing herbaceous or woody plants.

5. Slopes steeper than 1:1 should be considered for stabilization material such as jute matting.

L. ROADSIDE STRUCTURES

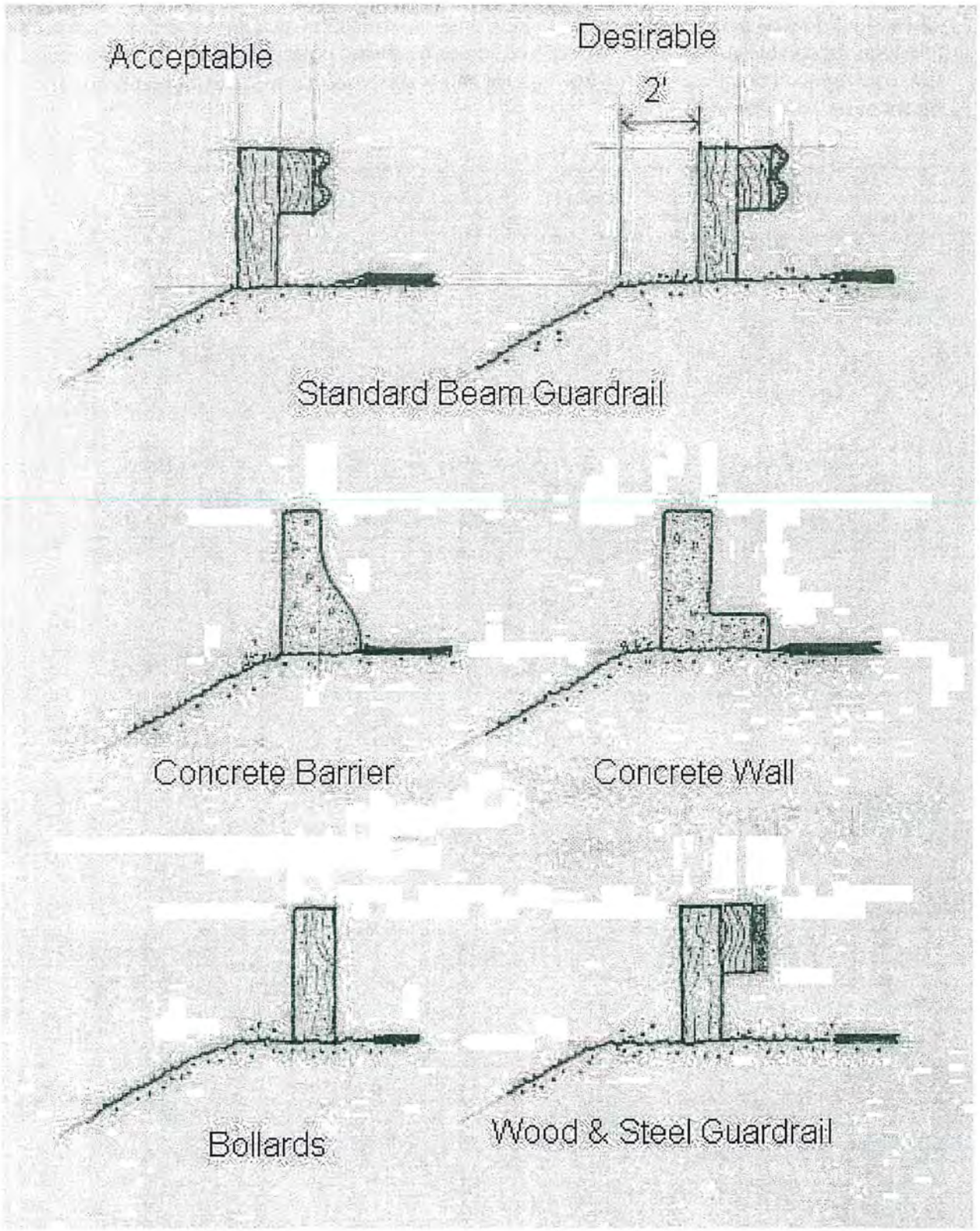
Structures located in the roadside have a strong visual impact due to their close proximity to the roadway. Their proper design and location are important factors to consider. Roadside structures must fulfill functional requirements, but they should also be characterized by simplicity and visual integration with the landscape. Set forth below are guidelines for the design and location of the more common roadside structures:

1. Culverts should be located to supplement natural drainage ways and to protect against erosion. To avoid unnecessary erosion, culverts should be placed a maximum of every 1000 feet. Fill slopes should not be steepened for shorter pipe lengths. The use of end sections will give greater length and improve hydraulics. The ends of culverts should not protrude unnecessarily beyond the grade of slopes and should be beveled for safety. The ends should be concealed with stones to give a natural appearance.

2. Bridges and large culverts should be located so natural stream channels are not disrupted, thus avoiding extensive rip-rapping and possible washout during times of high water. Their locations should also allow for a smooth approach of horizontal and vertical alignments.

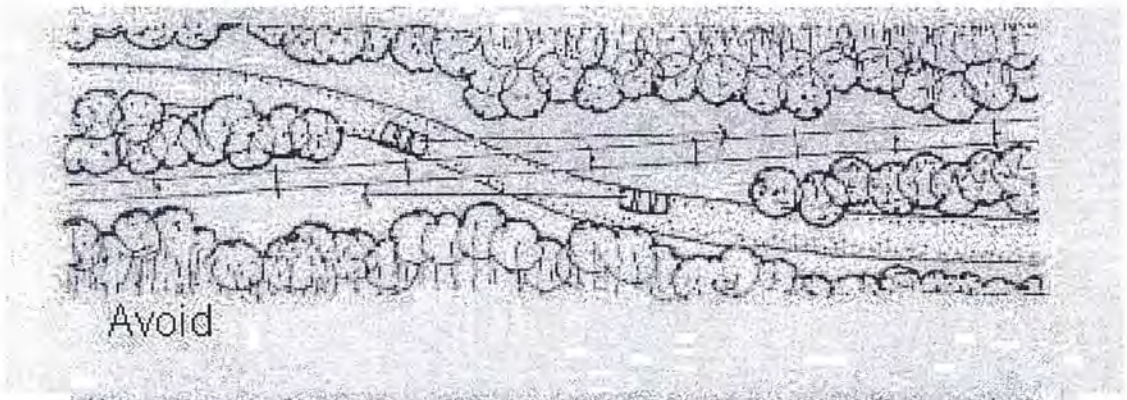
3. Guardrails should be provided where safety requires. A minimum two-foot shoulder should extend beyond the guardrail to provide support, a place for pedestrians and for aesthetics. Alternatives to the standard guardrails should be considered such as corten steel, crash walls,

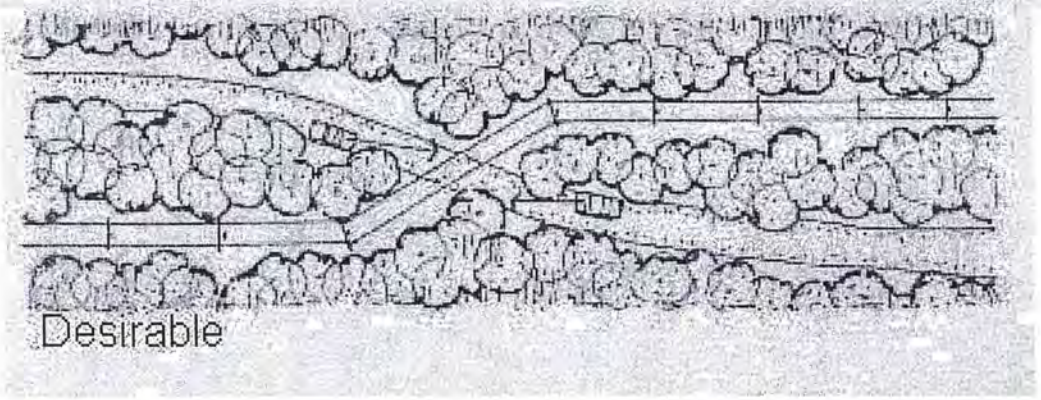
New Jersey barriers or timber rails. Bollards should only be used at pullouts and well removed from the roadway.

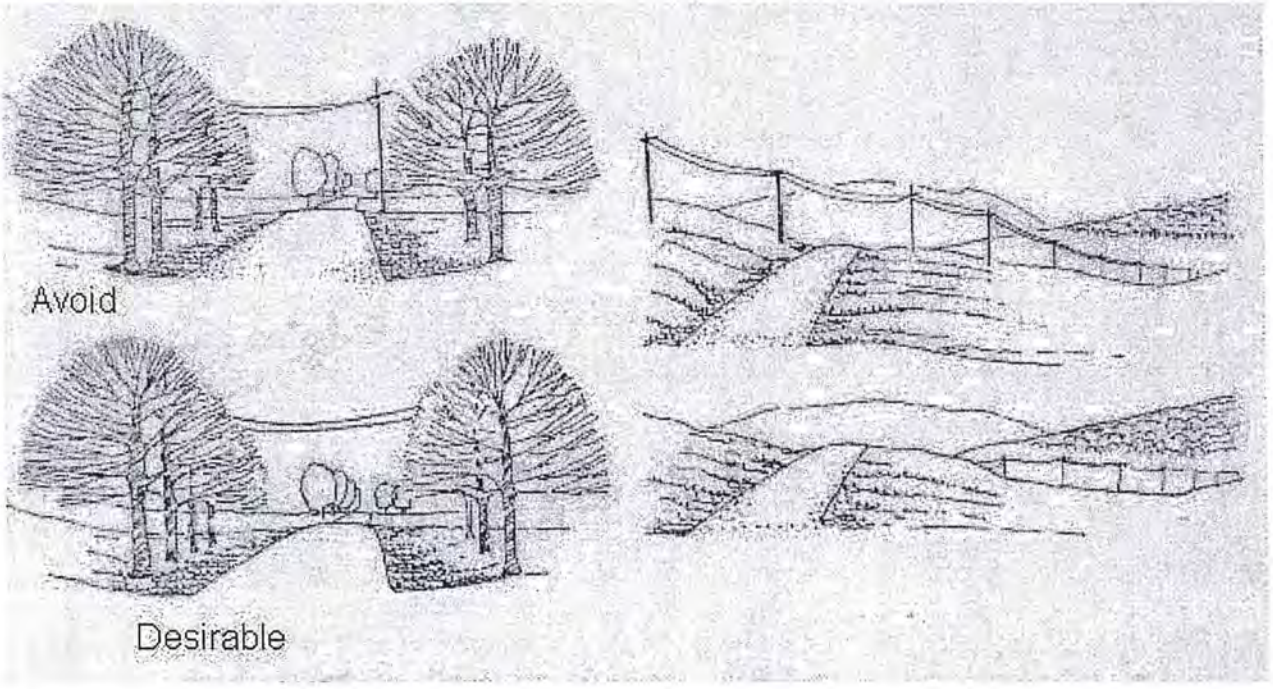


4. Electric and telephone utility lines should be located where they will have the least amount of impact on the view from the road. Poles and overhead lines should be located as close to the edge of a right-of-way as possible. Avoid lines which cross the roadway on a long diagonal.

Lines should cross perpendicular or at a sharp angle to the roadway. Curves and low areas are good locations for crossings. Where lines cross roadway, poles should be set back from the roadway to screen them from view and for safety purposes. Low growing plants should be encouraged under utility lines.







5. Road signs should only be used where necessary for traveling safely. They should be placed far enough in advance to allow a driver to adjust to the approaching condition. Try to avoid locations which interfere with views of important features. Non-traffic related signs should be discouraged though some can provide meaningful information.

M. ROADSIDE PLANTING

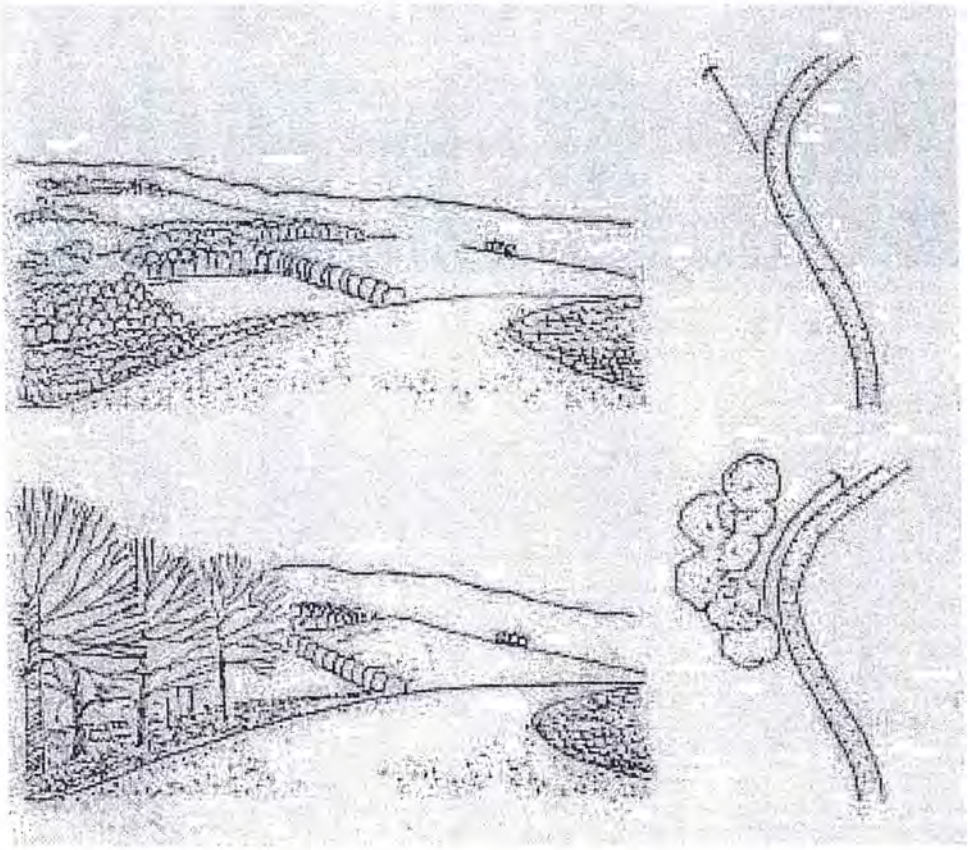
The scenic quality of a county road is very closely related to the abundance and close proximity of vegetation in the roadside. The colors, forms, and variety of plants provide visual contrast and diversity through all seasons. Plants also stabilize roadside slopes against erosion. Every effort should be made to protect and conserve the vegetative resource when modifications are made to a road. However, removal of vegetation is often necessary, and when extensive, the natural setting of a road is disrupted. When this occurs, it takes a very long time for natural vegetation to regenerate. Therefore, the roadside should be planted to restore scenic amenity, increase safety, and reduce maintenance. Some of the functional uses of roadside planting are to:

1. Protect against soil erosion.

2. Reduce dust and noise.

3. Protect adjacent landowners.

4. Reinforce roadway alignment by emphasizing changes in direction.



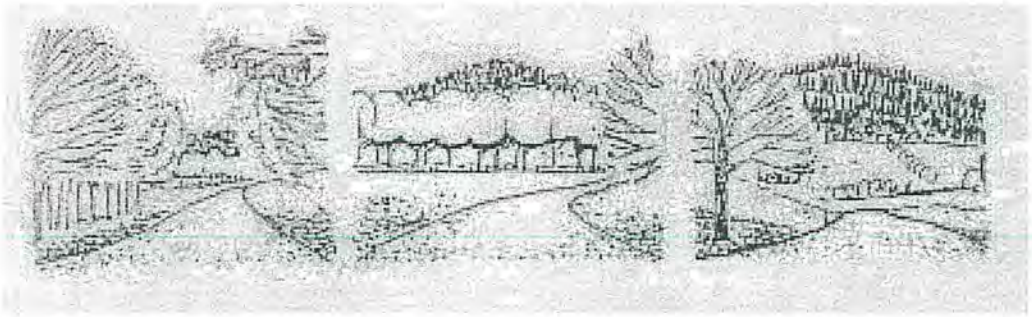
5. Maintain driver attention by providing contrast and diversity along the roadside.

6. Hide distasteful features from the roadway.

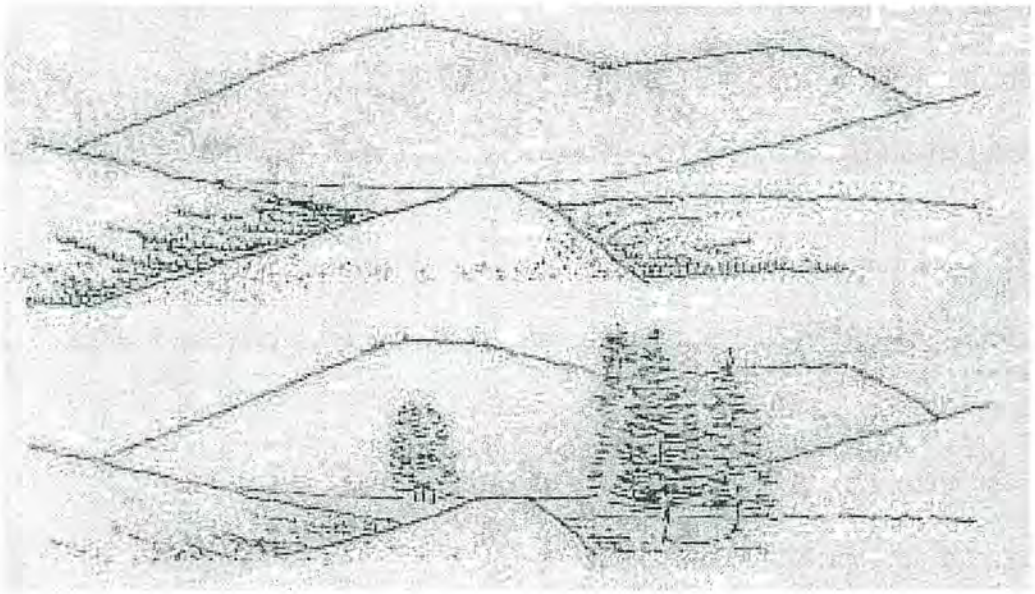
For aesthetic purposes, roadside planting can be used to:

1. Create visual diversity and contrast through variation in size, shape, texture, and color;

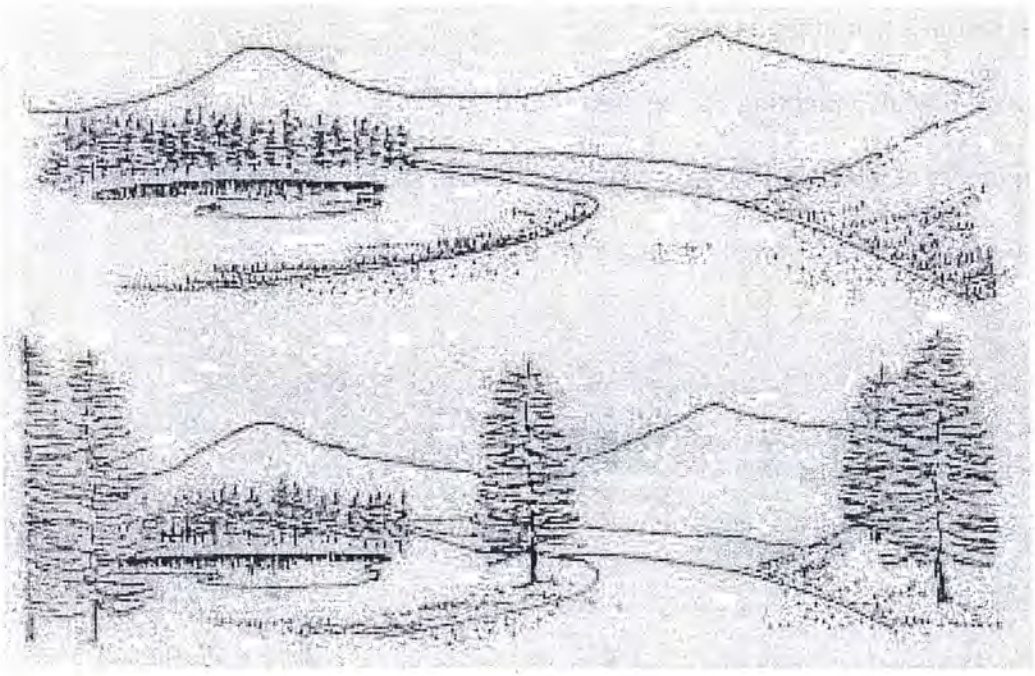
2. Modify the sequence of views through varying gaps in the roadside;



3. Maintain scale and perspective with the surrounding landscape;



4. Emphasize or focus important features;



5. Screen visually objectionable objects.

6. Provide habitat for wildlife.

The following considerations should guide the selection of plant materials for use in roadside planting:

1. Use native plant materials.

2. Use a wide range of vegetation including trees, shrubs, vines, wild flowers, ferns, and ground covers.

3. Use plants which are suited for the physical characteristics of the site, i.e., soil type, sun, shade, moisture, etc.

4. Consider the appropriate methods for transplanting.

5. Consider plant hardiness. Plants growing nearby will give an indication of species that might be suitable.

6. Avoid plants which require careful treatment, maintenance or wet climate.

7. Avoid plants which are easily susceptible to insects and diseases.

8. Trees that are weak and might easily be broken by wind or snow loads should be placed away from the roadway.

9. Use small sized plants which can be easily removed from their natural site and transplanted with greater chance of survival.

10. Avoid noxious weeds.

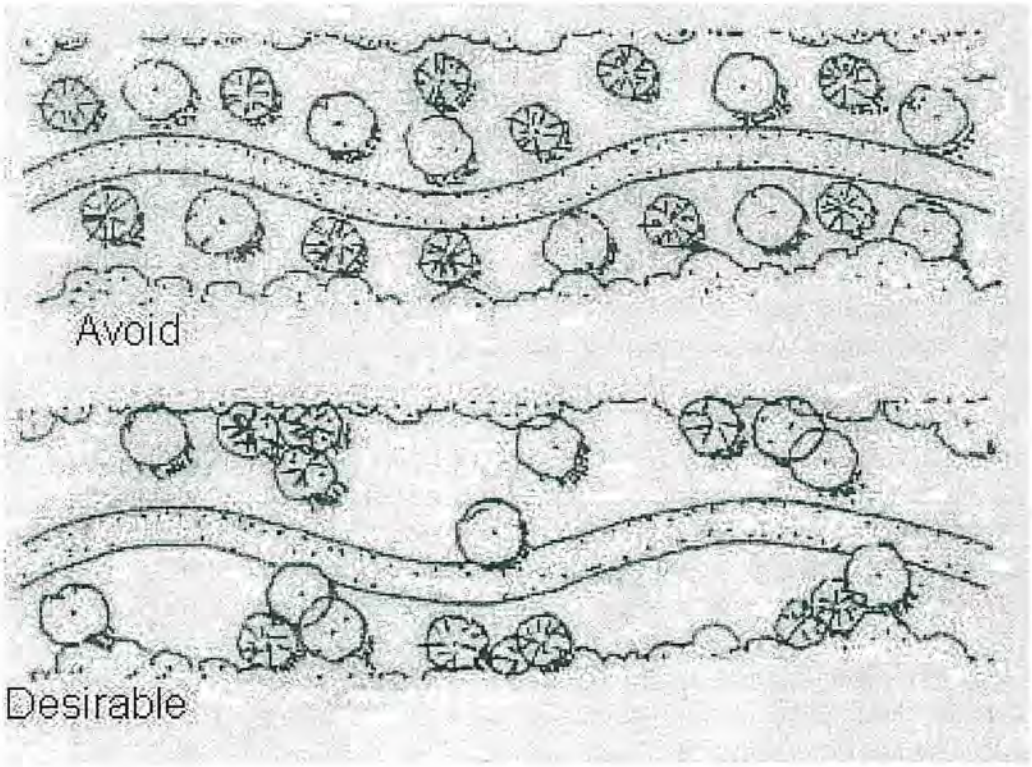
When planting the roadside, it is important to relate the arrangement and location of plants to the natural patterns of existing vegetation. The following guides will be helpful to achieve compatible relationships:

1. Plants should not be planted in geometric or uniform patterns, nor randomly scattered in a meaningless pattern.

2. Plants should be informally grouped in masses and clumps, with attention given to combinations which will provide diversity and contrast.

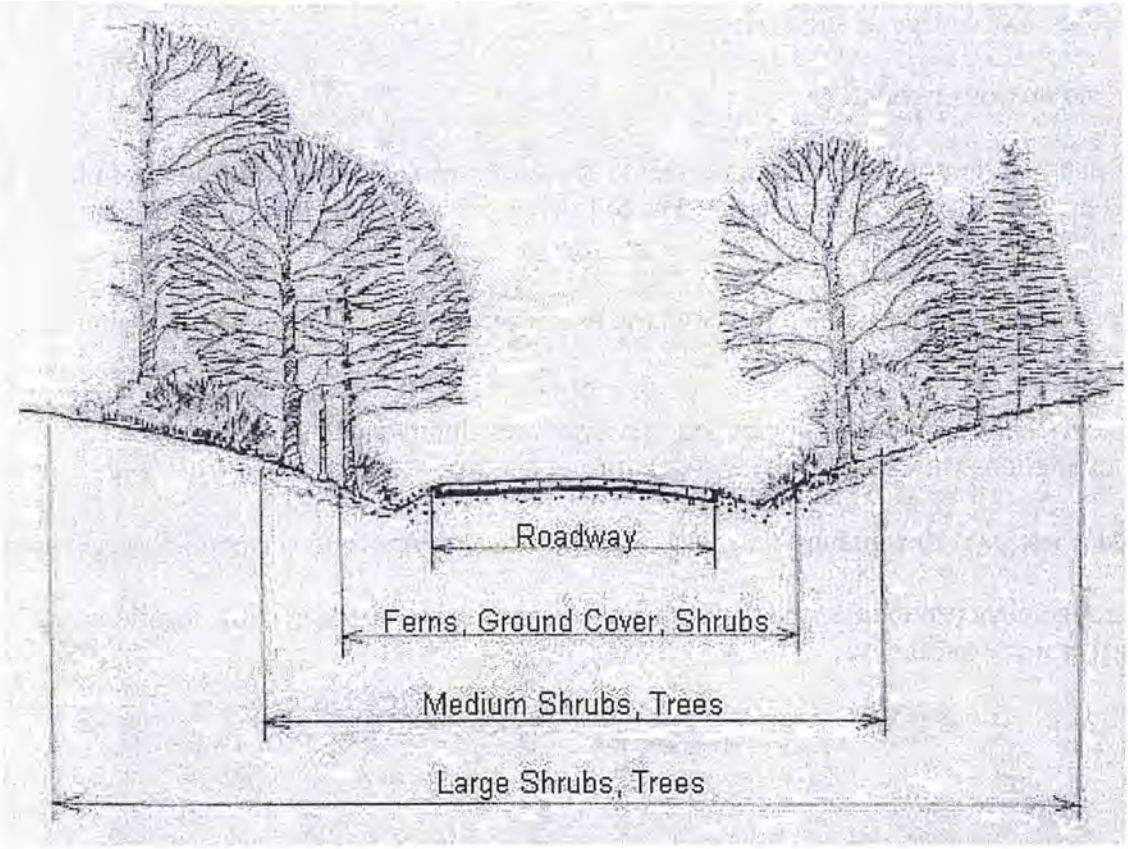
3. Space trees so when mature they will be proportional in size with surrounding vegetation.

4. Arrange plants so their edge is uneven and closer to the roadside in some locations and further away in others.



5. Wildflowers, ferns, ground covers, and low growing plants should be placed close to the roadway so their detail will be easily visible.

6. At various intervals, plant shade trees, evergreens, or other interesting species to provide focal points along the roadside.



7. Plant low height vegetation versus shrubs and trees next to roadway to maintain safe sight distance.

8. If a tree-lined effect is appropriate, space the trees at uneven intervals and with slight variations in distance from the edge of the roadway.

N. VEGETATION MANAGEMENT

Along many county roads there exist numerous opportunities to greatly enhance scenic quality and improve operational safety through the proper management of roadside vegetation. It is important to note that the gains from improving some sites may not outweigh the costs of selective thinning and clearing. Therefore, efforts should be concentrated on those roadside sections where the maximum gain in scenic value and operational safety can be created.

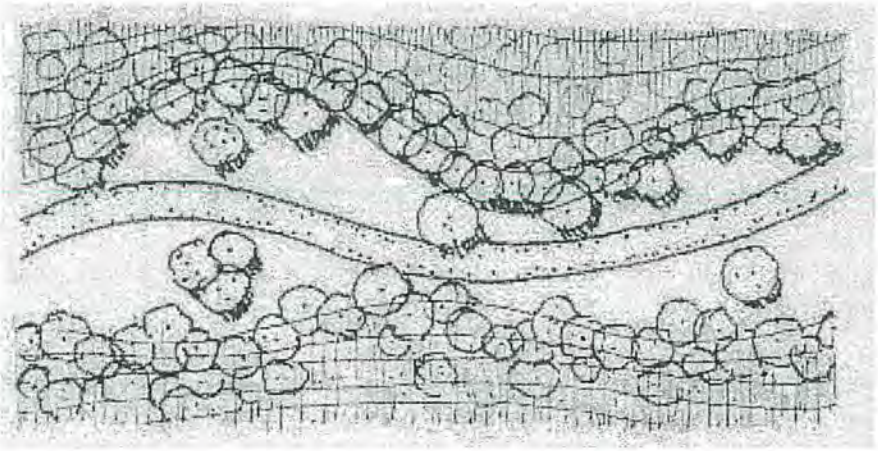
When carrying out vegetation management for these purposes, the basic visual requirement is that the roadside should have a natural appearance in harmony with the surrounding landscape. The practices listed below should be carried out with that objective in mind:

1. On curves with poor sight distance, thinning and clearing of vegetation may improve views so alteration of the alignment will not be necessary.

2. Vegetation near the roadway should not consist of weak-wooded or dead trees that constitute a blow-down hazard or are visually unattractive. These trees should be trimmed or removed to encourage the growth of hardier, disease resistant vegetation. Leaning trees, whether on public or private property, should be removed.

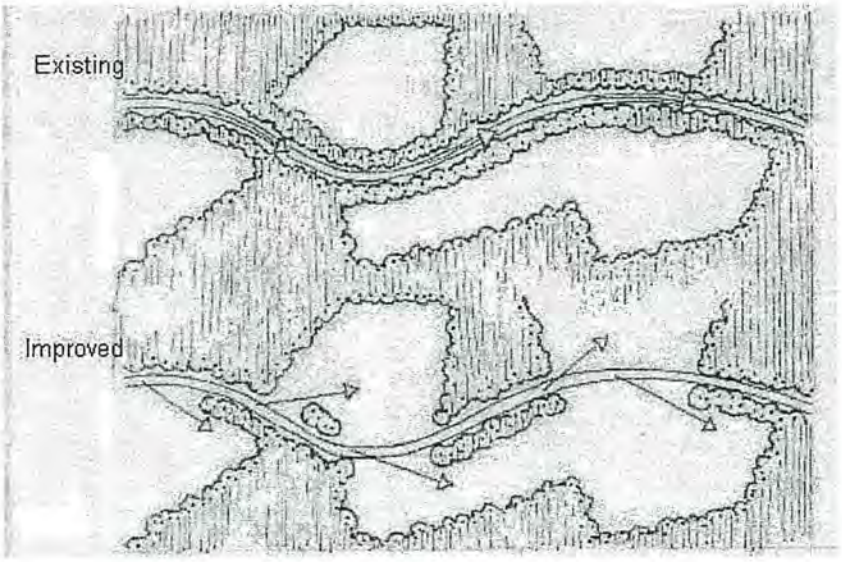
3. Cut vegetation close to the ground to hasten decay, reduce fire hazard, and to avoid the immediate unsightliness of forest cuttings.

4. The edge of woods should be maintained as an irregular line and generally follow the contours of the roadside.



5. Retaining understory shrubs in masses will provide a variety of spring and fall colors and a transition in size from ground covers to trees.

6. Thinning roadside vegetation adjacent to open fields and retaining it close to the roadway in wooded areas will help to vary the sequence of apertures along the roadside.



7. Stands of large trees or smaller interesting trees such as maples or oaks may be exposed to provide visual accents.

8. Selective thinning of vegetation at varying intervals along a densely wooded roadside will add visual interest by allowing views to penetrate the forest growth.
9. Mowing within the first 4' from the traveled roadway should occur 2-3 times per year to protect sight lines and avoid grass fires. Beyond the first 4' should be mowed or brushed at least once a year. Where mowing is conducted to control unwanted woody vegetation, it should be repeated only every second or third year or more often where the vegetation creates a safety problem.

10. Selective thinning and clearing of roadside vegetation should be carried out where the opportunity exists to create distant panoramic views of the landscape. Property owners should be encouraged to open vistas and allow territorial or unique feature views.

11. Trimming of branches should be done close to the tree trunk and treated where appropriate.

12. Tree trimmings and other debris may be chipped and mulched alongside the roadway when appropriate.