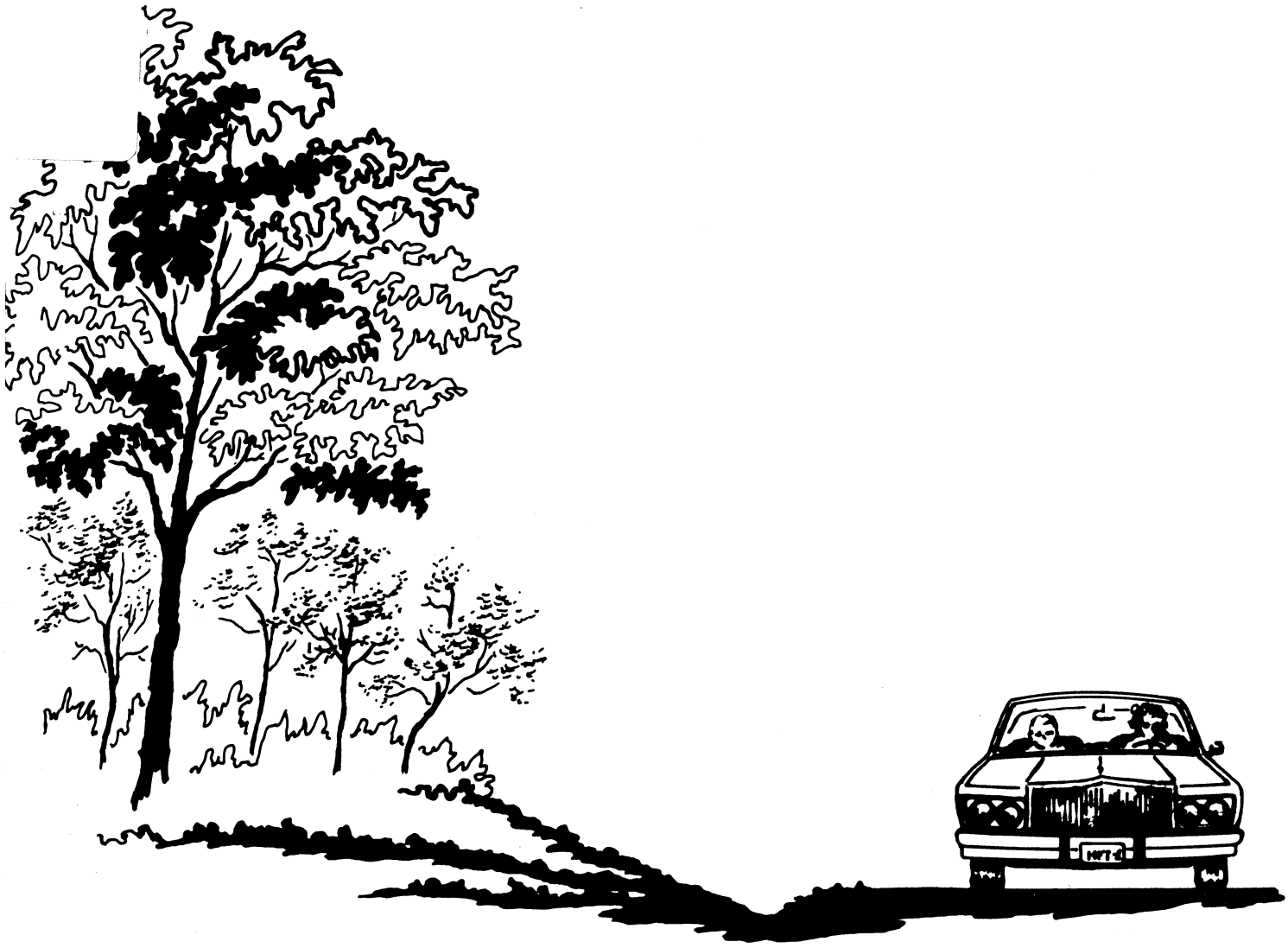

GUIDELINES FOR PLANTING ALONG VIRGINIA'S ROADWAYS

COMMONWEALTH OF VIRGINIA

Department of Highways and Transportation

Environmental Division

GUIDELINES FOR PLANTING ALONG VIRGINIA'S ROADWAYS

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CONTENTS

Forward v

Introduction vii

Section I 1
Design Speeds 50 MPH or Greater

Section II 9
Design Speeds Less Than 50 MPH,
But Greater than 35 MPH

Section III 17
Design Speeds 35 MPH and Less

Section IV 19
Tree Suggestions

Section V 25
Planting Agreement Guidelines

Glossary 31

FORWARD

This guideline has been prepared to assist in the development of landscape projects along the roadways throughout the Commonwealth. While the main function of these guidelines is to promote proper planting, the safety aspects and maintenance operations have been given much consideration. The primary reference sources are "A Guide For Highway Landscape and Environmental Design" and "A Policy On Geometric Design of Highways and Streets," published by the American Association of State Highway and Transportation officials.

This guideline supersedes all earlier documents.

Leo H. Rutledge

Leo H. Rutledge, Coordinator
Landscape Design Section

Recommended for Approval:

9-3-86 — DATE

ENVIRONMENTAL ENGINEER

9/4/86 — DATE

DIRECTOR OF ENGINEERING

Approved:

9/4/86 — DATE

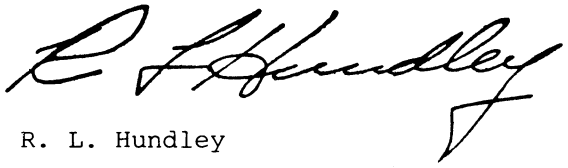
CHIEF ENGINEER

INTRODUCTION

This Guideline for Planting along Virginia Roadways provides broad policy statements for highway landscaping. The guideline's purpose is to ensure quality and consistency that conform with accepted landscape architectural principles and practices. We intend these guidelines to aid in the highway safety program as well as our maintenance operations.

The guidelines have been developed to allow the Virginia Department of Highways and Transportation personnel maximum flexibility to respond appropriately to the varying environment throughout the Commonwealth. (Note: All specific site circumstances and planting desires may not be covered in this guideline.) Also, it will provide the private sector, including developers and garden clubs, with data on roadside planting.

The Environmental Division will assist in implementing these guidelines as well as provide guidance in dealing with specific site conditions not covered here.



R. L. Hundley
Environmental Engineer

SECTION I

GUIDELINE FOR PLANTING

ROADWAYS

WITH

DESIGN SPEEDS 50 MPH OR GREATER

I. Planting is reflective of the overall highway facility. Traffic requirements, safety, natural features, environmental circumstances, and maintenance should be considered in the development of each design.

II. Planting may achieve a special purpose along the highway, including:

A. Screening for headlight glare.

B. Screening of undesirable views and/or objects.

C. Planting for traffic indication - i.e., bridge approaches, entrance and exit areas, change in horizontal alignment.

D. Planting to control snow and sand drifts.

E. Planting to improve the long range maintenance operations.

F. Planting to improve the aesthetics of the area.

Fencing or other structural material may supplement or be used in place of plant material.

III. Safety conditions influence plant location.

A. Major trees shall be planted at least 37 feet from the edge of the traveled way except in special circumstances, such as:

1. Where concrete barriers, walls or other rigid obstructions are used. In these cases, a minimum of four (4) feet behind the obstruction shall remain clear.

2. Where flexible guardrail is used, the following shall apply:

Guardrail Type	Description	Post Spacing	Maximum Deflection or Minimum Distance to Plant Pit
GR 2	Blocked-Out W Beam	6'-3"	6 feet
2A	(Strong Post System)	3'-1½"	4 feet
GR 3	Cable	16'	12 feet
GR 8	Standard W Beam	12'-6"	9 feet
8A	(Weak Post System)	6'-3"	7 feet
8B		3'-1½"	5.5 feet

3. Where there are barrier curbs near the traveled lane, the setback for major tree planting shall be at least 37 feet.

B. Sight distance to traffic information signs or other fixed traffic control devices shall be maintained. Approximately 1" of letter height on sign equals 50 feet of sight distance. Terrain and other natural features may require additional considerations.

C. Sight distances at a major road intersecting with a minor road or crossover shall be guided by the following:

Height of Eye = 3.5' Height of Object = 4.25'

Design Speed =	50	55	60
2 lane major road (Figure I)	500'	550'	600'
4 lane major road (Figure II)	600'	650'	700'

D. In the areas where ramps are used to merge the traffic into the main line, the design speed of the ramp shall determine the section of this guideline that governs the planting of material between the ramp and the right of way.

Where the median width is greater than 60 feet, each roadway will be considered separately. Other natural conditions and design requirements will be taken into consideration, also.

IV. Roadside maintenance should be considered in the development of planting projects.

A. Planting pits for shrubs behind guardrail should be located a minimum of one-half the anticipated spread (diameter) of the plant at maturity.

B. Plants in masses should be mulched completely between the planting pits.

C. Consideration should be given to planting hard-to-mow areas with masses of vines or shrubs.

D. Mulch should extend to the front face of the guardrail or the edge of the shoulder.

E. Cultural characteristics, especially salt tolerance, should be considered.

F. A minimum of one mowing swath (6 feet) behind ditches should remain free of trees or shrubs.

G. Ditches should remain free of plant material and mulch.

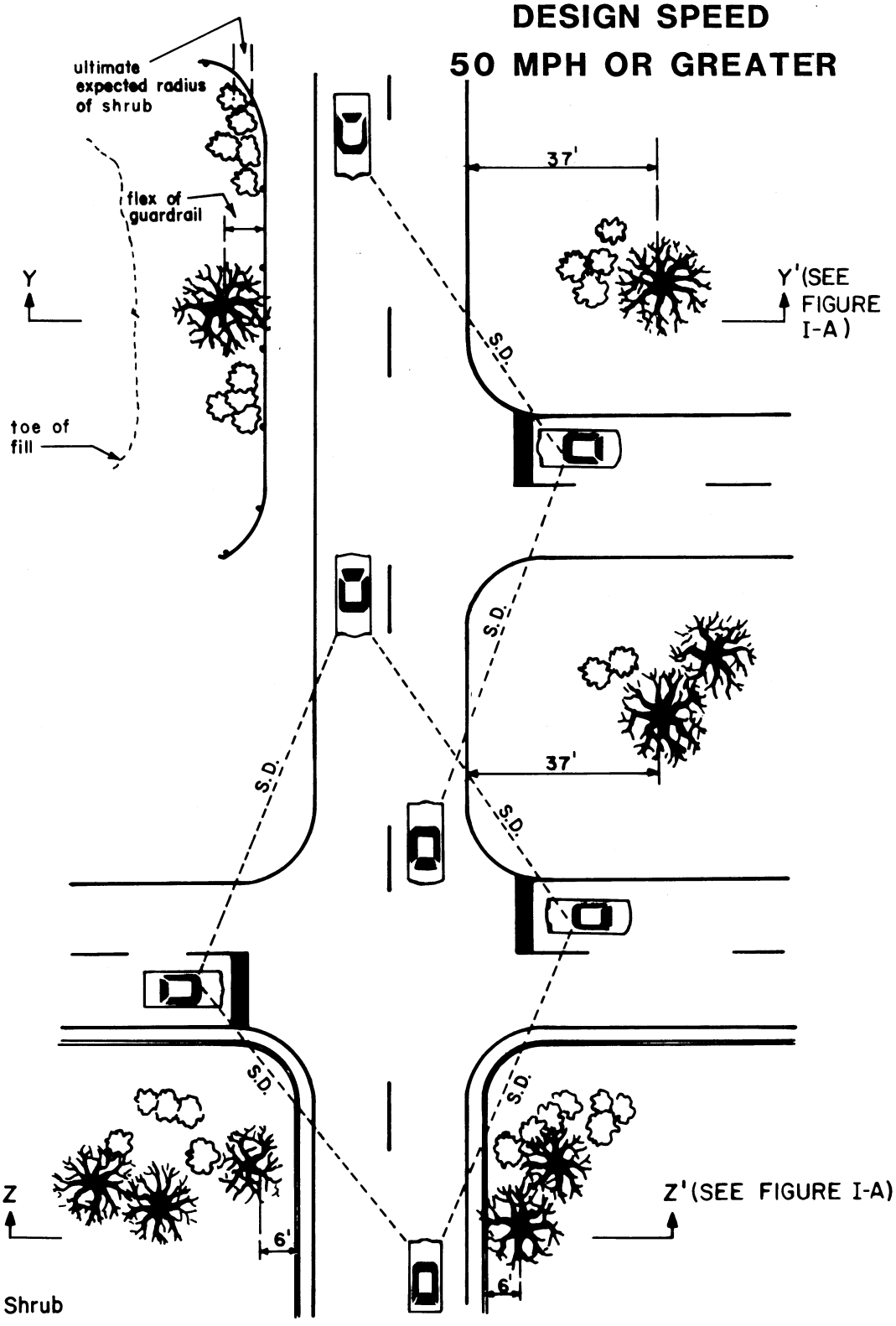
H. Other factors such as run off to and drainage of restricted areas, air pollution, and reflective heat of the pavement should be considered in the selection of plant material.

I. When masses of plants are desired, the pits should be spaced closely to allow rapid lapping of the branches.

J. The location of overhead and underground utilities should be considered in the selection and placement of plant material.

K. Mowing operations (type of equipment, turning radius, etc.,) should be taken into consideration in the design.

FIGURE I
2 LANE HIGHWAY
DESIGN SPEED
50 MPH OR GREATER

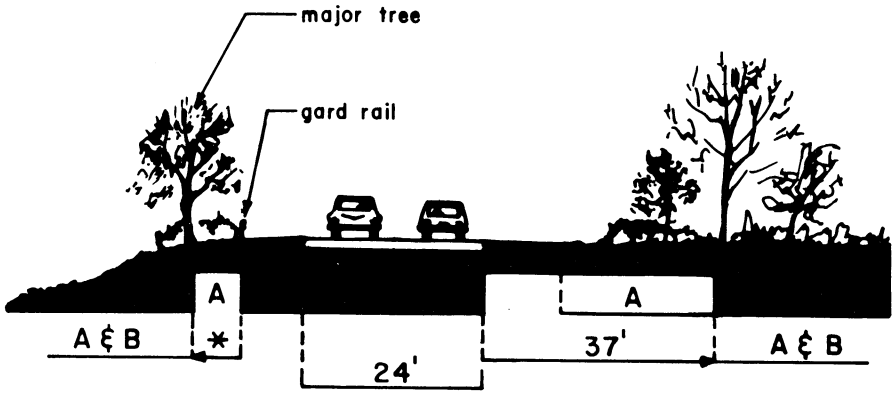


LEGEND

- Major Tree
- Minor Tree or Shrub
- Vehicle
- Guardrail
- Curb
- S.D. Sight Distance
- Stopping Point

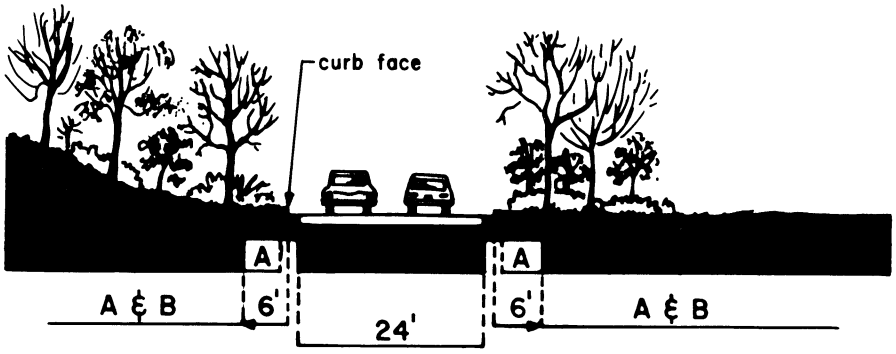
Note: In areas between S.D. line and intersection, low shrubs (2' maximum growing height) or ground cover only permitted.

FIGURE I - A



* Flex of Guardrail

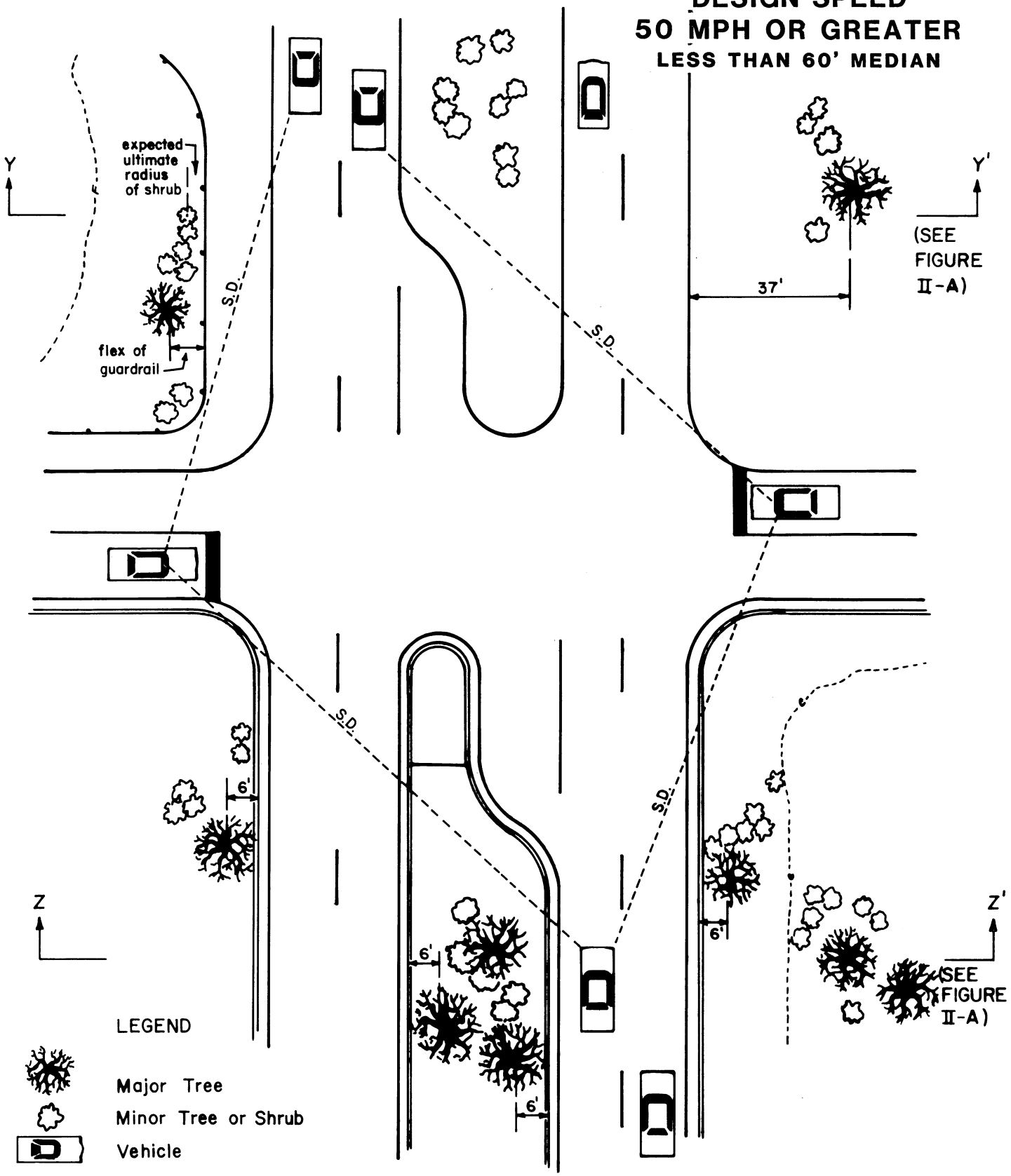
SECTION Y-Y'



SECTION Z-Z'
CURBED SECTION

ZONE A · Minor Trees & Shrubs Permitted
ZONE B · Major Trees Permitted

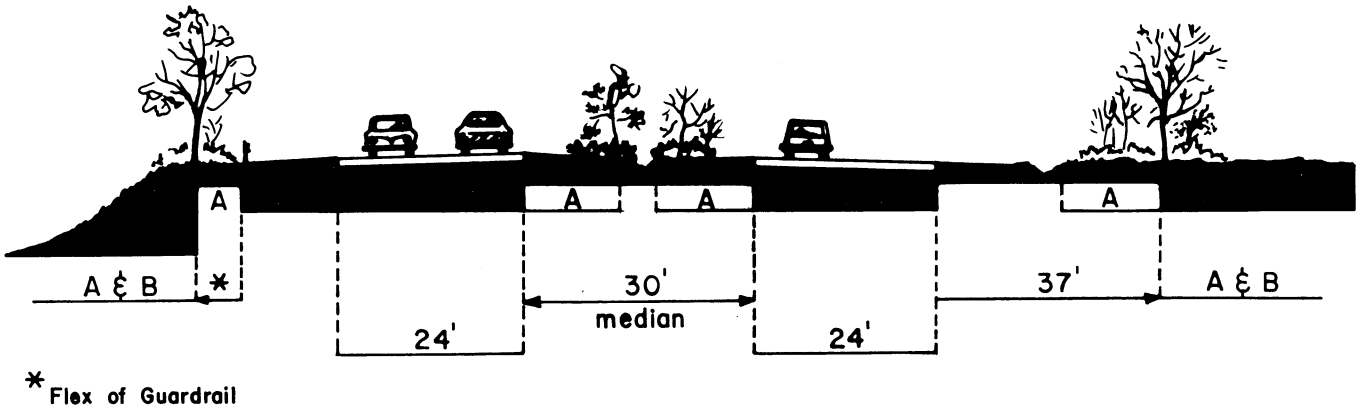
FIGURE II
4 LANE HIGHWAY
DESIGN SPEED
50 MPH OR GREATER
LESS THAN 60' MEDIAN



Note: In areas between S.D. line and intersection, low shrubs (2' maximum growing height) or ground cover only permitted.

FIGURE II - A

SECTION Y-Y'



*Flex of Guardrail

ZONE A · Minor Trees & Shrubs Permitted
ZONE B · Major Trees Permitted

SECTION Z-Z'

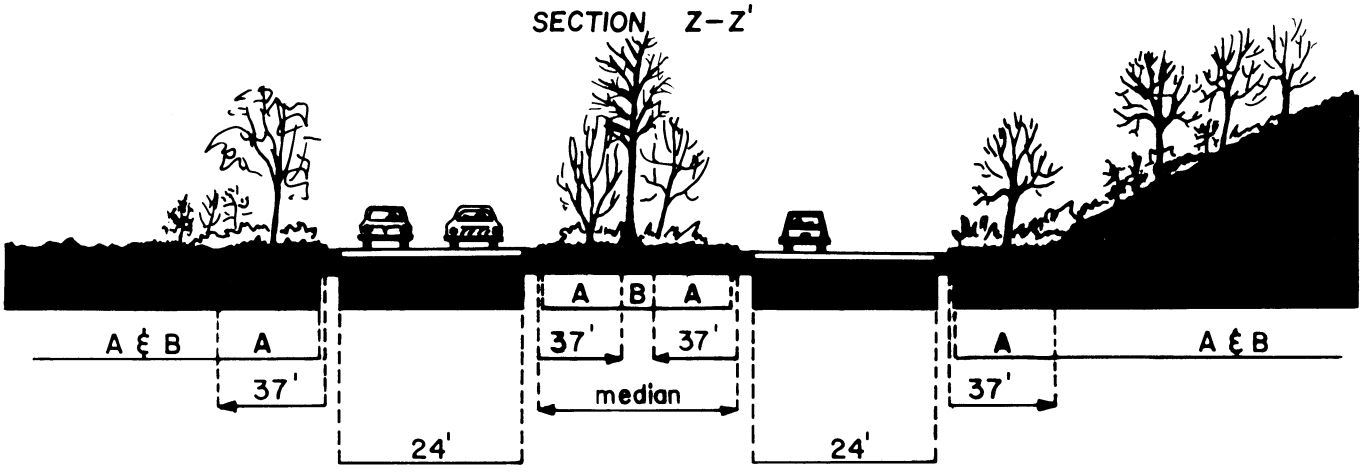
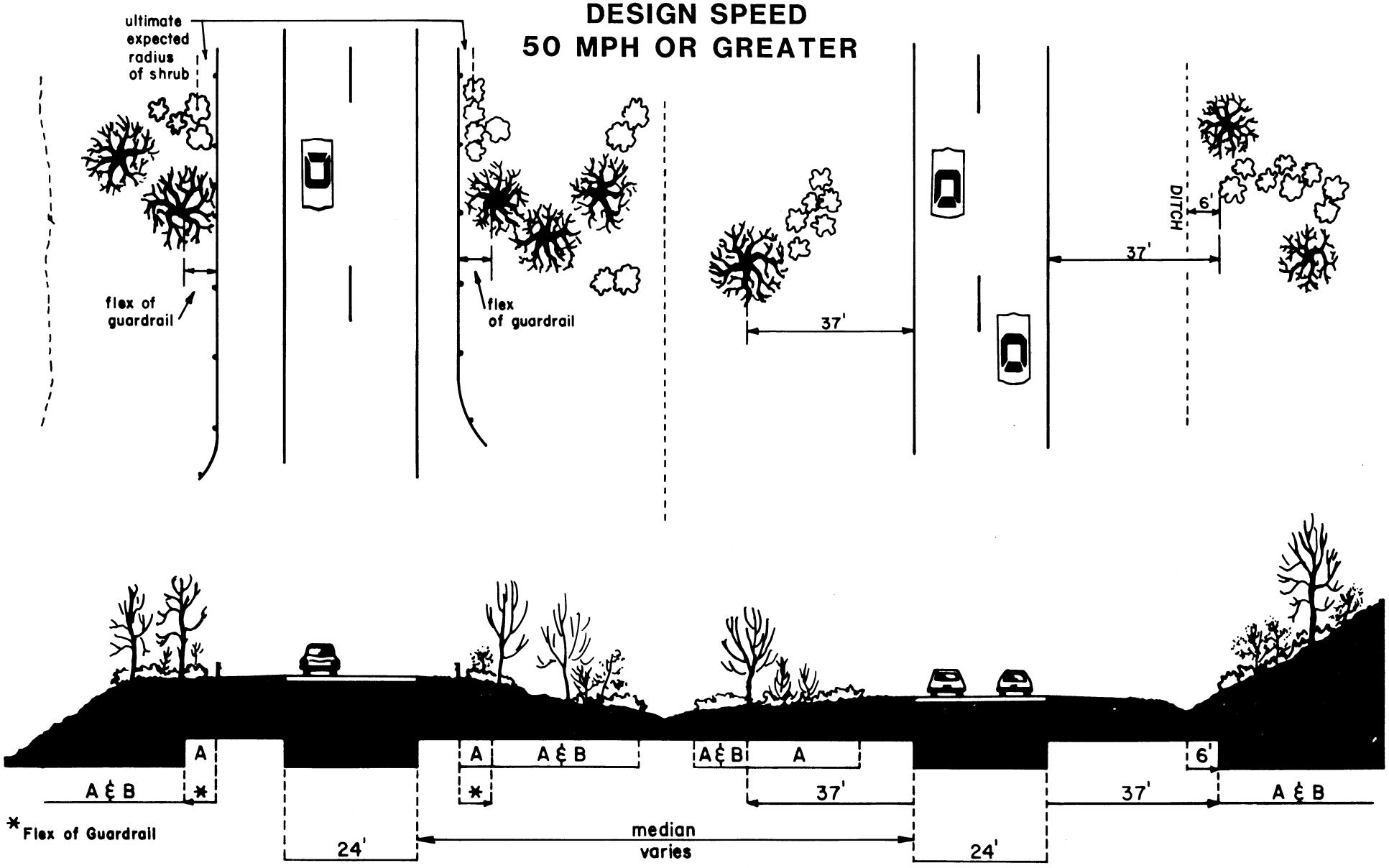


FIGURE II - B
INTERSTATE HIGHWAY
DESIGN SPEED
50 MPH OR GREATER



SECTION II

GUIDELINES FOR PLANTING

ROADWAYS

WITH

DESIGN SPEEDS LESS THAN 50 MPH, BUT GREATER THAN 35 MPH

I. The planting of areas where speeds are restricted allows for greater flexibility in the use of plant material. Nevertheless, the overall safety, maintenance, and aesthetic considerations should be weighed in the design process. Additionally, in urban areas, consideration also will be given to local guidelines or accepted practices. Because a greater length of time is required to traverse an urban area, greater attention should be given to minor details.

II. Some of the special purposes that should be addressed through planting in areas of highways of this design speed are as follows:

A. Screening for headlight glare - evergreen material is desirable.

B. Screening of undesirable views and/or objects - primary evergreen material desirable.

C. Planting for traffic indication - i.e., bridge approaches, entrance and exit areas, change in horizontal alignment.

D. Planting to control snow and sand drifts.

E. Planting to aid in the long range maintenance operations.

F. Planting to improve the aesthetics of the area.

III. Safety Considerations

A. Major trees shall be planted at least 25 feet from the edge of the traveled way except in special circumstances such as:

1. Cuts 3 to 1 or steeper. Major trees may be planted a minimum of 10 feet behind the center of the ditch.

2. Where concrete barriers or other rigid obstructions are used, major trees should be at least 4 feet behind the obstruction.

3. Where flexible guardrail is in place, the following chart shall apply:

Guardrail Type	Description	Post Spacing	Maximum Deflection or Minimum Distance to Plant Pit
GR 2	Blocked Out W Beam	6'-3"	6 feet
2A	(Strong Post System)	3'-1½"	4 feet
GR 3	Cable	16'	12 feet
GR 8	Standard W Beam	12'-6"	9 feet
8A	(Weak Post System)	6'-3"	7 feet
8B		3'-1½"	5.5 feet

4. Where there are barrier curb near the travel way, major trees may be installed six (6) feet (minimum) behind the face of the curb. Where there is a parking lane adjacent to the travel way there is no definite setback; however, a minimum setback for major trees of 3 feet is suggested.

Additional on site conditions will allow for greater or less flexibility in these guidelines.

B. Sight distance to traffic information signs or other fixed traffic control devices shall be maintained. Approximately 1 inch of letter height on a sign equals 50 feet of sight distance. Terrain and other natural features may require additional considerations.

C. Sight distance at a major road intersecting with a driveway, minor road or crossover shall be guided by the following:

Height Eye 3.5' Height of Object 4.25'

Design Speed =	30	35	40	45	50
2 Lane Major Road (Figure III & IIIA)	300'	350'	400'	450'	500'
4 Lane Major Road (Figure IIIB & IIIC)	350'	400'	475'	525'	600'

D. In the areas where ramps are used to merge the traffic into the main line, the design speed of the ramp shall determine the section of this guideline that governs the planting of material between the ramp and the right of way.

Natural features, site conditions, and design requirements will also be taken into consideration in the final determination in all cases noted above.

IV. Roadside maintenance should also be taken into account in the development of planting projects.

A. Planting pits for shrubs behind guardrail should be a minimum of one-half the anticipated spread (diameter) of the plant at maturity.

B. Plants in groups should be mulched completely in between the planting pits.

C. Consideration should be given to planting hard to mow areas with groups of vines or shrubs.

D. Mulch should extend to the front face of the guardrail or the edge of the shoulder.

E. Salt tolerance should be taken into consideration where applicable.

F. In urban conditions other factors such as run off to and drainage of restricted areas, air pollution, and reflective heat of the pavement should be considered in the selection of plant material.

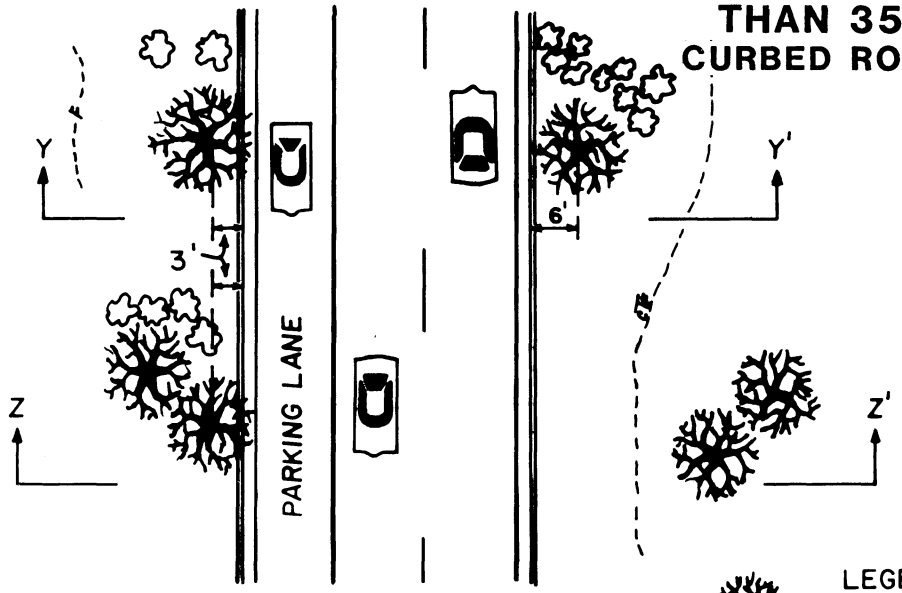
G. When masses are desired, plants should be spaced close enough to each other to allow for rapid lapping of the branches.

H. The location of overhead and underground utilities should also be considered in the selection and placement of plant material.

I. Plant material and mulch should be placed to avoid the obstruction of drainage features or ditches.

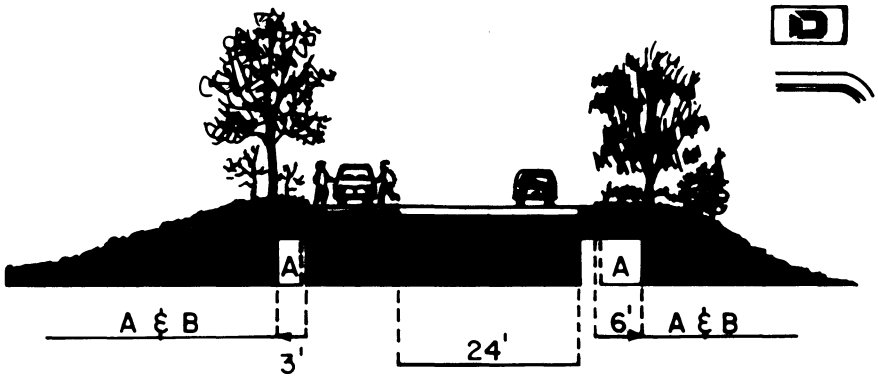
J. Mowing operations (type of equipment, turning radius, etc.,) should be considered in the development of the design.

FIGURE III
2 LANE HIGHWAY
DESIGN SPEED LESS THAN 50 MPH BUT GREATER THAN 35 MPH
CURBED ROADWAY



LEGEND

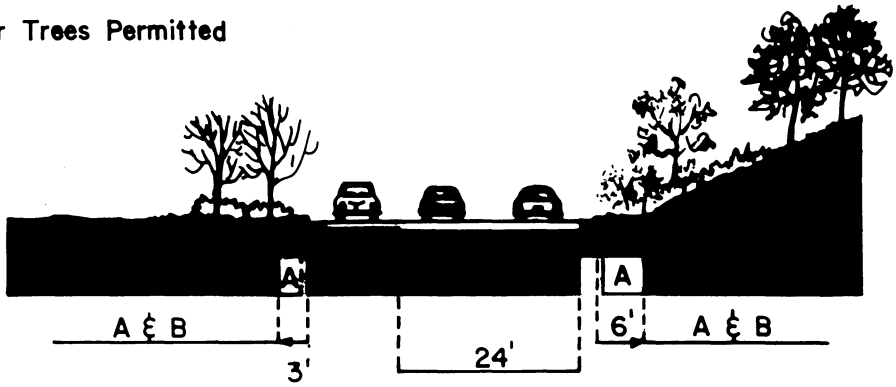
- Major Tree
- Minor Tree or Shrub
- Vehicle
- Curb



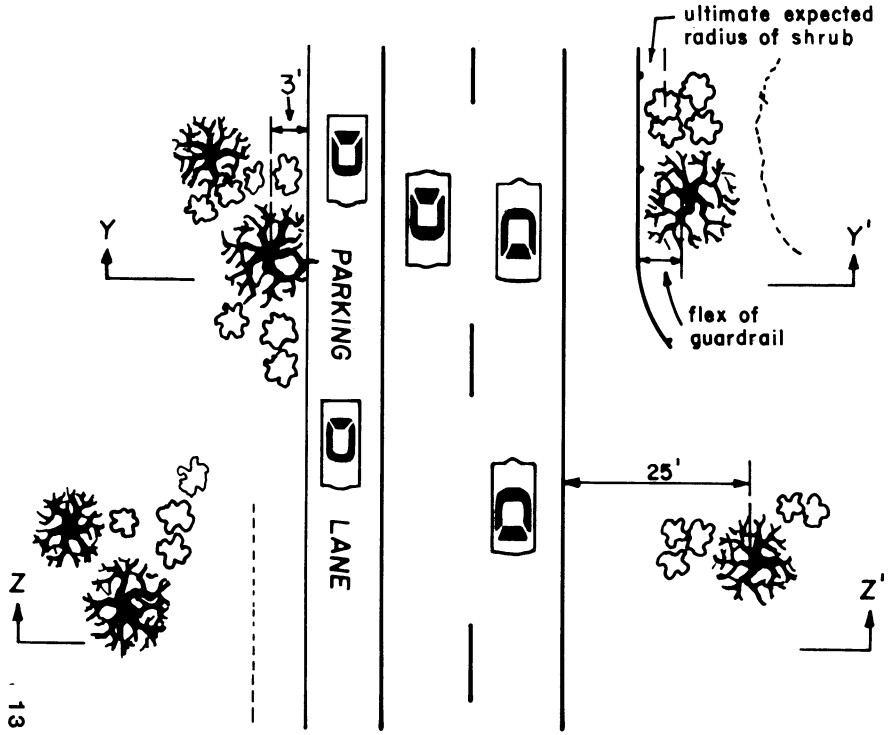
SECTION Y-Y'

ZONE A · Minor Trees & Shrubs Permitted

ZONE B · Major Trees Permitted



SECTION Z-Z'



LEGEND

Major Tree

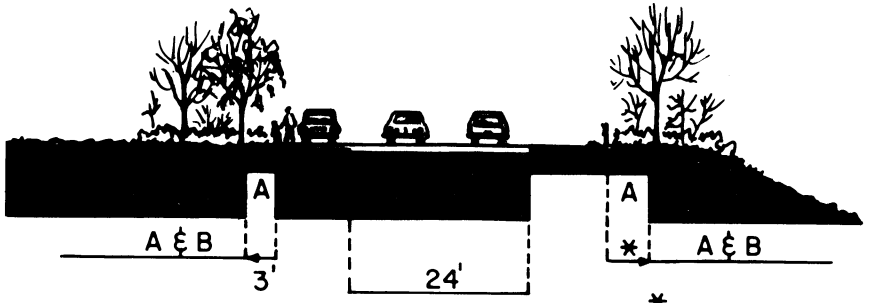
Minor Tree or Shrub

Vehicle

Guardrail

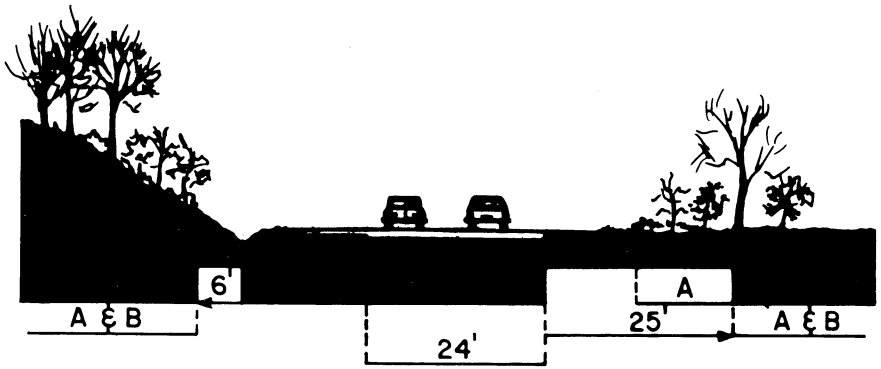
ZONE A · Minor Trees & Shrubs Permitted

ZONE B · Major Trees Permitted



SECTION Y-Y'

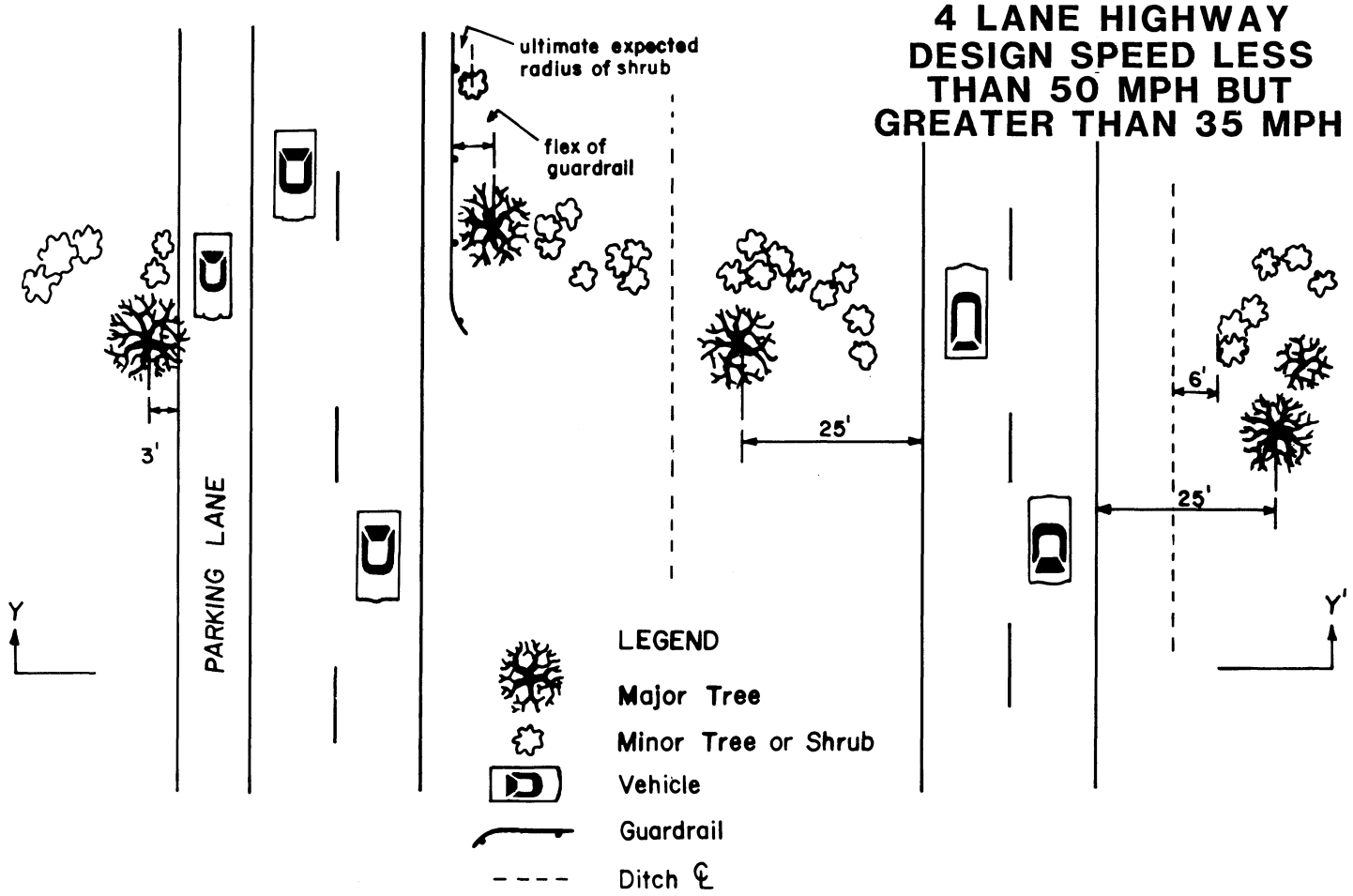
*Flex of Guardrail

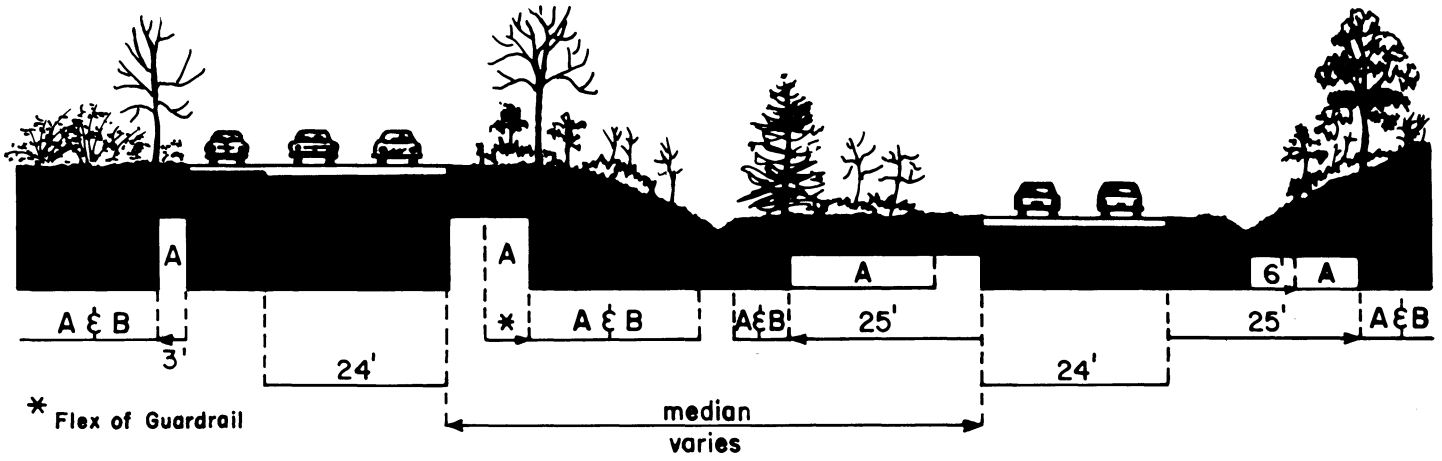


SECTION Z-Z'

FIGURE III - A
2 LANE HIGHWAY
DESIGN SPEED LESS
THAN 50 MPH BUT
GREATER THAN 35 MPH

FIGURE III - B
4 LANE HIGHWAY DESIGN SPEED LESS THAN 50 MPH BUT GREATER THAN 35 MPH



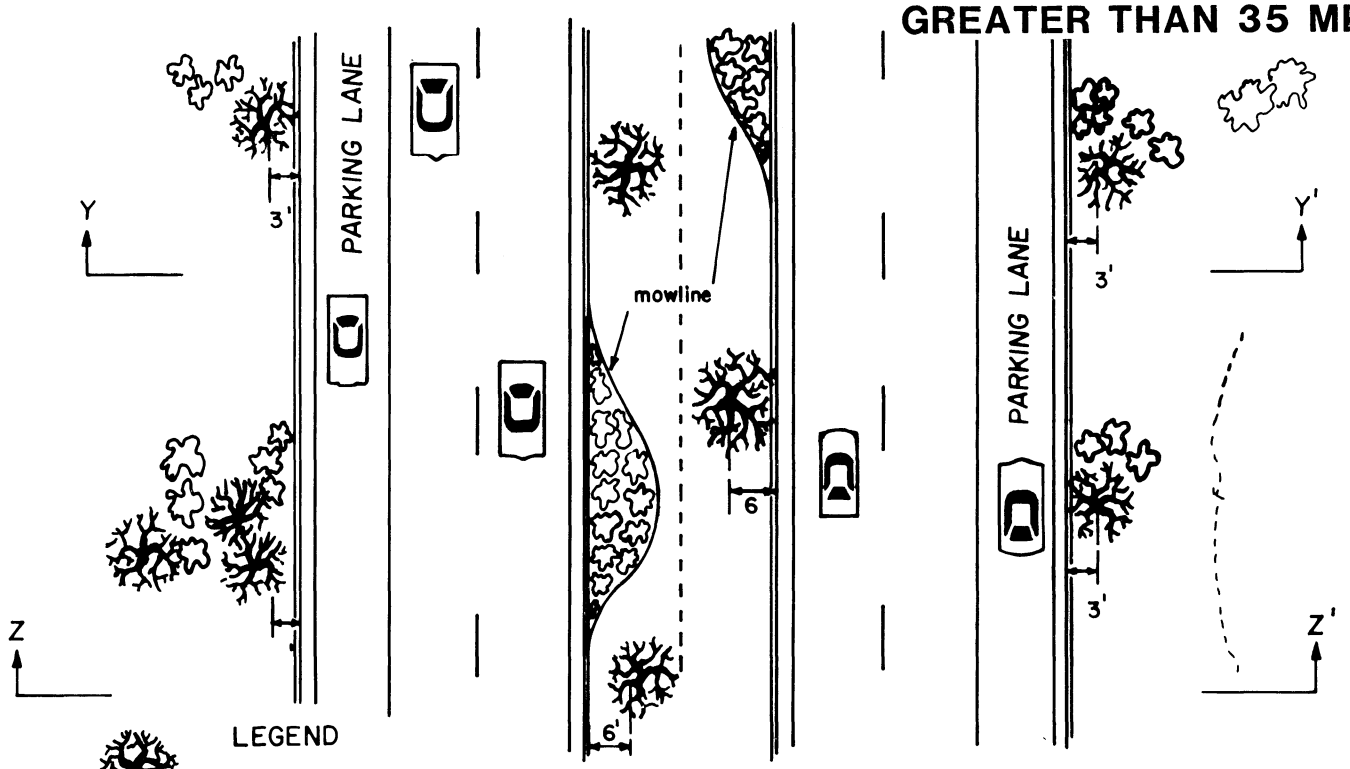


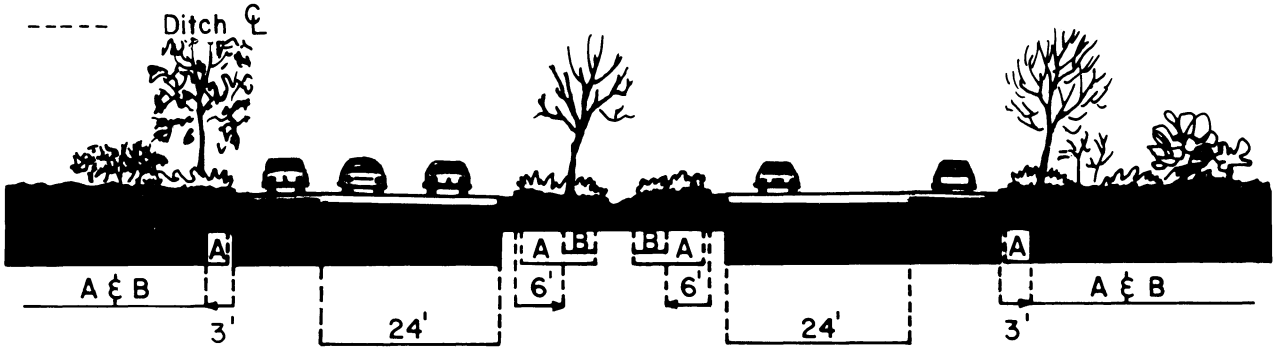
ZONE A · Minor Trees ℄ Shrubs

ZONE B · Major Trees Permitted

SECTION Y-Y'

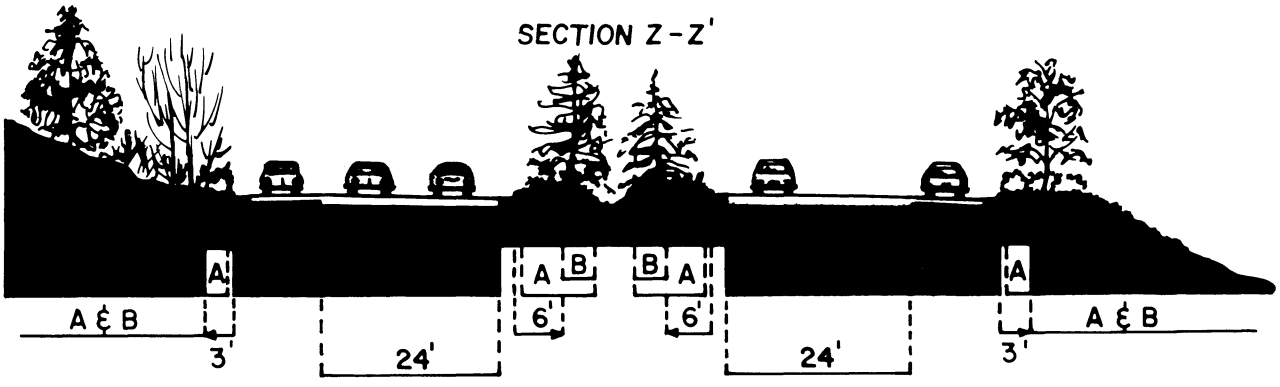
FIGURE III - C
4 LANE HIGHWAY DESIGN SPEED LESS THAN 50 MPH BUT GREATER THAN 35 MPH





SECTION Y - Y'

SECTION Z - Z'



ZONE A · Minor Trees & Shrubs Permitted

ZONE B · Major Trees Permitted

SECTION III

GUIDELINES FOR PLANTING

ROADWAYS

WITH

DESIGN SPEEDS 35 MPH AND LESS

I. Areas where the design speed is 35 mph or less allow the greatest flexibility in the use of plant material. Primarily, these areas are in urban or residential corridors and consist of street trees that can be limbed up to provide adequate sight distance from driveways, cross-streets, etc. The local guidelines or accepted practices play an important part in the design of these areas. Likewise, safety and maintenance should be taken into consideration.

As noted in the AASHTO Policy on Geometric Design of Highways and Streets, "landscaping of urban highways and streets assumes additional importance in mitigating the many nuisances associated with the urban traffic. Landscaping can reduce this contribution to urban blight and make the urban highways and streets better neighbors."

II. Some of the special purposes that should be addressed through planting in areas of roadways of this design speed are as follows:

A. Screening of undesirable views and/or objects. Evergreen material or fencing is desirable.
B. Planting for traffic indication - i.e., bridge approaches, changes in horizontal alignment.
C. Planting to aid long range maintenance operations.
D. Planting to improve the aesthetics of an area.

III. Safety Considerations

A. Trees (major or minor) may be planted approximately 25 feet from an intersecting driveway or street. These trees should be limbed up approximately 6 feet. As stated by the AASHTO Guideline, the clear zone for urban arterials, collectors and local streets, where barrier curbs are utilized, is a minimum distance of 1.5 feet beyond the face of the curb. Where shoulders are provided, rather than curbs, a minimum clear zone of 10 feet should be provided.

B. Sight distance to traffic information signs or other fixed traffic control devices shall be maintained. Approximately 1 inch of the letter height on a sign equals 50 feet of sight distance. Terrain or other natural features may require additional considerations.

IV. Roadside maintenance also should be taken into account in the development of planting projects.

A. Plants in groups should be mulched completely in between the planting pits.
B. Consideration should be given to planting hard-to-mow areas with vines or shrubs.
C. Mulch should extend to the back of the curb or edge of the shoulder.
D. Salt tolerance should be taken into consideration in the selection of the plant material. Also, air pollution and reflective heat from the pavement and buildings should be considered.
E. When masses are desired, plants should be spaced closely to allow for rapid lapping of the branches.
F. The location of overhead and underground utilities should be considered in the selection and placement of the plant material.
G. Plant material and mulch should be placed to avoid obstruction of drainage features or ditches.
H. Mowing operations (type of equipment, turning radius, etc.) should be considered in the development of the design.

SECTION IV

TREE SUGGESTIONS

The trees shown on the lists which follow represent an example of the types that are considered acceptable in the broad sense of minor and major trees. Other species will be considered on a case by case basis.

A. Minor trees

Plant Name	H = Height S = Spread	General Form
Acer ginnala Amur Maple	H = 18' - 20' S = 10' - 20'	Vase
Acer palmatum Japanese Maple	H = 15' - 25' S = 15' - 20'	Rounded
Acer tataricum Tatarian Maple	H = 15' - 25' S = 20' - 30'	Upright
Amelanchier canadensis Downy Serviceberry	H = 18' - 25' S = 12'	Upright
Cercis canadensis Eastern Redbud	H = 20' - 25' S = 15' - 30'	Rounded
Chionanthus virginicus White Fringetree	H = 10' - 20' S = 8' - 15'	Upright
Cornus Florida Flowering Dogwood	H = 20' - 25' S = 15' - 20'	Flat topped

Plant Name	H = Height S = Spread	General Form
Cornus kousa Kousa Dogwood	H = 20' S = 15' - 20'	Vase
Cotinus coggygria Common Smoketree	H = 15' S = 15' - 20'	Rounding
Crataegus phaenopyrum Washington Hawthorn	H = 30' S = 20' - 25'	Oval
Ilex X fosteri Foster's Holly	H = 25' S = 10' - 15'	Conical
Juniperus virginiana 'cannaertii' Cannaert Eastern Redcedar	H = 20' S = 8' - 10'	Pyramidal
Koelreutaria paniculata Goldenraintree	H = 30' S = 20'	Rounded
Lagerstroemia indica Crapemyrtle (Tree Form)	H = 15' - 20' S = 10' - 15'	Rounded
Magnolia X soulangeana Saucer Magnolia	H = 20' - 30' S = 20' - 30'	Rounded
Magnolia stellata Star Magnolia	H = 15' - 20' S = 10' - 15'	Rounded
Malus hupehensis Tea Crabapple	H = 20' - 25' S = 15' - 18'	Vase
Oxydendrum arboreum Sourwood	H = 25' - 30' S = 20' - 25'	Upright to Pyramidal

Plant Name	H = Height S = Spread	General Form
Prunus cerasifera 'Thundercloud' Thundercloud Purple Plum	H = 15' - 20' S = 10' - 15'	Rounded
Prunus serrulata 'Kwanzan' Kwanzan Oriental Cherry	H = 15' - 20' S = 8' - 10'	Upright
Rhus typhina Staghorn Sumac	H = 20' - 25' S = 20'	Irregular
Taxus cuspidata 'capitata' Upright Japanese Yew	H = 20' - 40' S = 15' - 20'	Pyramidal
Thuja orientalis Oriental Arborvitae	H = 18' - 25' S = 10' - 12'	Columnar to Pyramidal
Viburnum prunifolium Blackhaw	H = 12' - 15' S = 8' - 12'	Rounded

B. Major Trees

The major trees listed below represent the upright, columnar or pyramidal trees that could be adapted to street tree planting. Other species may be considered on a case-by-case basis.

Plant Name	H = Height S = Spread	General Form
Acer platanoides 'columnare' Columnar Norway Maple	H = 30' - 40' S = 15' - 20'	Columnar

Plant Name	H = Height S = Spread	General Form
Acer platanoides 'Schwedler' Schwedler Norway Maple	H = 40' - 60' S = 30'	Upright
Acer saccharum Sugar Maple	H = 60' - 100' S = 50' - 80'	Upright
Carpinus betulus European Hornbeam	H = 40' - 60' S = 30' - 40'	Pyramidal
Chamaecyparis sp. Falsecypress	H = 50' - 70' S = 10' - 20'	Columnar
Cryptomeria japonica Japanese Cryptomeria	H = 50' - 60' S = 20' - 30'	Pyramidal
Fraxinus pennsylvanica Green Ash	H = 50' - 60' S = 25' - 30'	Upright
Ginko biloba Ginkgo	H = 50' - 70' S = 40'	Pyramidal
Gleditsia triacanthos inermis Locust Species	H = 50' - 70' S = 30'	Upright to Pyramidal
Ilex opaca American Holly	H = 18' - 40' S = 12' - 20'	Pyramidal
Juniperus chinensis Chinese Juniper	H = 60' - 75' S = 15' - 20'	Conical
Juniperus scopulorum Rocky Mountain Juniper	H = 30' - 40' S = 5' - 15'	Columnar

Plant Name	H = Height S = Spread	General Form
Juniperus virginiana Eastern Redcedar	H = 40' - 50' S = 8' - 20'	Upright
Larix decidua European Larch	H = 70' - 75' S = 25' - 30'	Pyramidal
Malus baccata Siberian Crabapple	H = 30' - 40' S = 15' - 20'	Broad
Nyssa sylvatica Black Tupelo	H = 30' - 50' S = 20' - 30'	Pyramidal
Picca glauca White Spruce	H = 40' - 60' S = 10' - 20'	Pyramidal
Pinus nigra Austrian Pine	H = 50' - 60' S = 20' - 40'	Pyramidal
Prunus sargentii Sargent Cherry	H = 40' - 50' S = 40'	Upright
Quercus palustris Pin Oak	H = 40' - 70' S = 25' - 40'	Pyramidal
Thuja occidentalis Eastern Arborvitae	H = 40' - 60' S = 10' - 15'	Pyramidal
Tilia cordata 'Greenspire' Greenspire Littleleaf Linden	H = 50' - 70' S = 20' - 25'	Narrow
Zelkova serrata Japanese Zelkova	H = 50' - 80' S = 40' - 60'	Vase

SECTION V

Guidelines Relative To Permits For Planting Within The Right Of Way

1. All requests to plant within the right of way shall be made to the Resident Engineer's office.

2. Upon receiving a request to plant, the Resident Engineer will transmit a "Planting Agreement" to be filled in and signed by the applicant's authorized representative.

3. The Planting Agreement, along with a sketch showing the location and type of planting, shall be returned to the Resident Engineer. The sketch shall conform to the Department's "Guidelines for Planting on Virginia's Roadways".

4. The Resident Engineer, along with the District Engineer's and Environmental Engineer's representatives, shall jointly review the proposed planting.

5. After favorable approval is received, the installation of the material may proceed.

The following represents the "Planting Agreement" forms that are available to be issued to the permittee.

"Planting Agreement A" indicates that the permittee will supply the plant material to the Department for planting.

"Planting Agreement B" indicates that the permittee will be allowed to install the plant material. Specific safety guidelines may also be required.

PLANTING AGREEMENT A

Date _____ District _____ County _____

In an effort to secure a more pleasing appearance on the roadsides between _____and _____ on Route _____, the _____ _____ _____ agrees to furnish the nursery stock as outlined on the attached sketch, which is made a part of this agreement.

In accepting the above the parties agree to the following:

1. The permittee shall furnish all plant material to the Department or have it delivered to the job site. This plant material shall comply to the AAN Standards and with the state and federal laws that pertain to inspection for plant diseases and insect infestation.

2. If requested, the Department will place an order with a nursery for the plant material with the understanding that the invoice is to be sent to the permittee.

3. The Department will plant the material as outlined on the sketch.

4. The Department will maintain the plant material; however, the Department cannot be expected to provide maintenance such as that given a front yard or garden, but will maintain the plantings within its labor and funding limitations. The permittee or interested groups may be permitted to maintain special areas.

5. When plants or funds are available for such purposes, the Department will undertake to replace any material that may die.

6. If the plant material allowed under this agreement becomes a traffic hazard (as determined by the Department), the Department may remove such planting.

The Department reserves the right to specify plant material that requires a minimum of maintenance.

Every effort will be made to locate the material in such a manner as to be outside the limits of future construction. In the future, should such material obstruct construction, it will be relocated only if economically practical.

Special Provisions: _____

_____

_____

The above conditions are agreed upon.

Name _____

Signed by _____

Title _____

Address _____

_____

Phone Number _____

Recommend Approval:

____ _____

Date Resident Engineer

Approved:

____ _____

Date District Engineer

____ _____

Date Environmental Engineer

PLANTING AGREEMENT B

Mr. _____ Date _____

Resident Engineer

Virginia Department of Highways County _____

and Transportation

_____

_____

Dear Mr. _____:

We, the undersigned, wishing to cooperate with the Virginia Department of Highways and Transportation (hereinafter referred to as the Department), request permission to _____

_____

between _____

and _____

on Route _____.

In requesting this permission, the following provisions are agreed to:

1. Any planting proposed shall be outlined clearly and a sketch of same made a part of this Agreement.

2. The applicant assumes the responsibility for the completion of the work outlined.

3. The applicant agrees to indemnify and save harmless the Department, the Highway and Transportation Board, and all its officers, agents and employees from all suits, actions of claims of any character, name or description which might arise from the construction of work permitted by this Agreement.

4. It is understood that should any planting allowed under this agreement become a traffic hazard, in the opinion of the Department, at its discretion the Department may remove such planting.

Name _____

Signed by _____

Title _____

Address _____

_____

Phone Number _____

Recommend Approval:

____ _____

Date Resident Engineer

Approved:

____ _____

Date District Engineer

____ _____

Date Environmental Engineer

GLOSSARY

Barrier Curb - Curbs that are relatively high (6 to 8 inches in height) and steep-faced which inhibit or at least discourage vehicles under a driver's control from leaving the roadway, but does not deflect or otherwise prevent an out of control vehicle from leaving the roadway.

Clear Zone - An unobstructed, relatively flat area provided beyond the edge of the traveled way for the recovery of errant vehicles.

Department - Virginia Department of Highways and Transportation.

Major road - The primary road of two intersecting roads.

Major trees - Those whose trunk diameter at maturity will exceed four inches. Generally of the type as outlined in Section IV B of this Guideline.

Minor trees - Small flowering or evergreen species of the general type as outlined in Section IV A of this Guideline.

Permittee - Person or organization requesting permission to plant within the Department's right of way.

Plant pit - The center of the hole which is dug for planting.

Travel(ed) Way - The portion of the roadway used for the movement of vehicles, exclusive of shoulders and auxiliary lanes.