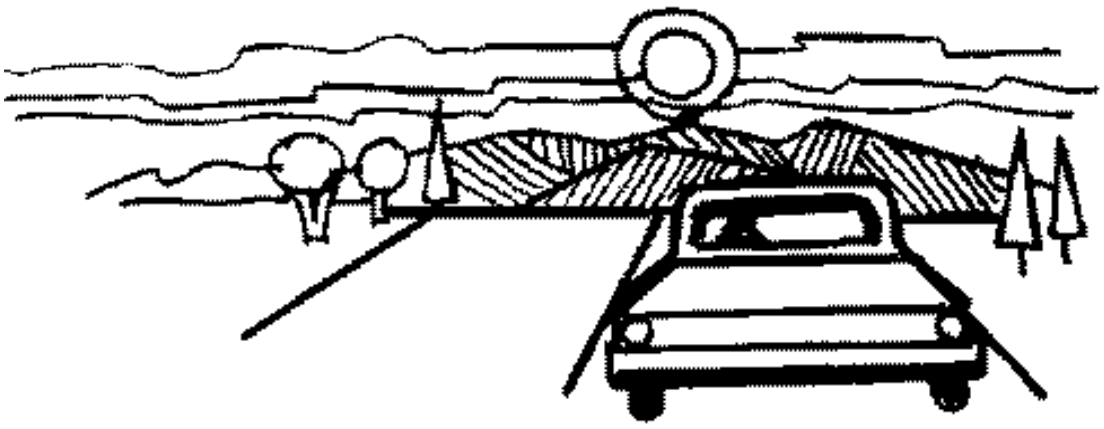
Regulations and Standards to Enhance Traffic Safety and Mobility in Powhatan County, VA

November 9, 2000



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Acknowledgment

Prepared in cooperation with the U.S. Department of Transportation, Federal Highway Administration, Federal Transit Administration, Virginia Department of Rail and Public Transportation, and the Virginia Department of Transportation.

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Executive Summary

Standards and Regulations to Enhance Traffic Safety and Mobility in Powhatan County, Va. will help in the process of regulating access to land development while preserving traffic flow. This process, which is called access management, focuses on managing existing roadways more efficiently and effectively. An effective access management program benefits a community by reducing accidents, increasing capacity, improving air quality, providing better access to businesses, and improving mobility. Overall, safety is improved, congestion is reduced, and the life of a roadway is extended with little cost to taxpayers.

Powhatan County is a rural community located in the lower piedmont area of Virginia and encompasses 272 square miles. Traditionally, the county has been dominated by farm and timber uses. However, increasing residential population and commercial development are changing the rural landscape. The challenge for Powhatan is to foster the county's economic well being while maintaining the long-term safety and mobility of its road network. This report, *Standards and Regulations to Enhance Traffic Safety and Mobility in Powhatan County, Va.* is one tool that will assist in meeting this challenge.

In FY 1999, Powhatan County requested that the Richmond Regional Planning District Commission staff study Route 60 to determine techniques to preserve its carrying capacity. This study, identified as part of the Richmond Area MPO's annual Unified Work Program, (UWP task 2.6), would include access standards and regulations that could be applied specifically to the Route 60 Corridor. The scope of this study was revised in FY 2000 to include researching information for additional standards and regulations that could be applied to all public roads in Powhatan.

Extensive research was conducted on access management principles and techniques to better manage the location and placement of driveways, entrances, and crossovers and to enhance the functional capacity of intersections on arterial, collector, and local roads. Based on this research, a ranking system of roads was developed which includes five access categories each with its own set of design standards. For example, Category 2 roads, which include arterial roads have more stringent design standards than Category 5, which includes local roads. Every road in Powhatan was ranked based on its function and placed into one of these five categories.

This report also includes regulations for subdivisions along corridors, shared and cross access, requirements for outparcel and phase development plans, reverse frontage, connectivity, interchange area for the new Route 288, nonconforming access features, and variances. Lastly, it provides guidance on traffic impact analysis, turn lane warrants, and subdivision/site plan review procedures. These standards and regulations were developed for coordinating the various types of access connection points to the road system that can be used by Powhatan County in reviewing requests for new entrances and exits for residential subdivisions and businesses.

Table of Contents

Section 1. Introduction

Everyone hates traffic congestion: waiting while someone makes a left turn in front of you, stop light after stop light, vehicles entering/exiting/turning in every direction. The result? Everyday travel takes longer and longer, more and more accidents occur, and motorists become increasingly frustrated. As traffic congestion starts to build up, the typical solution is to spend massive amounts of public funds to add more lanes of road. Yet even with such expenditures, over time the increasing number of traffic lights, intersections, and entrances and exits impedes traffic flow. Once these interferences are created, they are there forever. What can be done?

The most effective strategy to deal with traffic congestion is to take steps early on **to prevent it from occurring in the first place.** The best way to do this is to limit and control the number of and distances between entrances/exits and intersections on the roadway. Managing vehicular access to the roads, then, is the key.

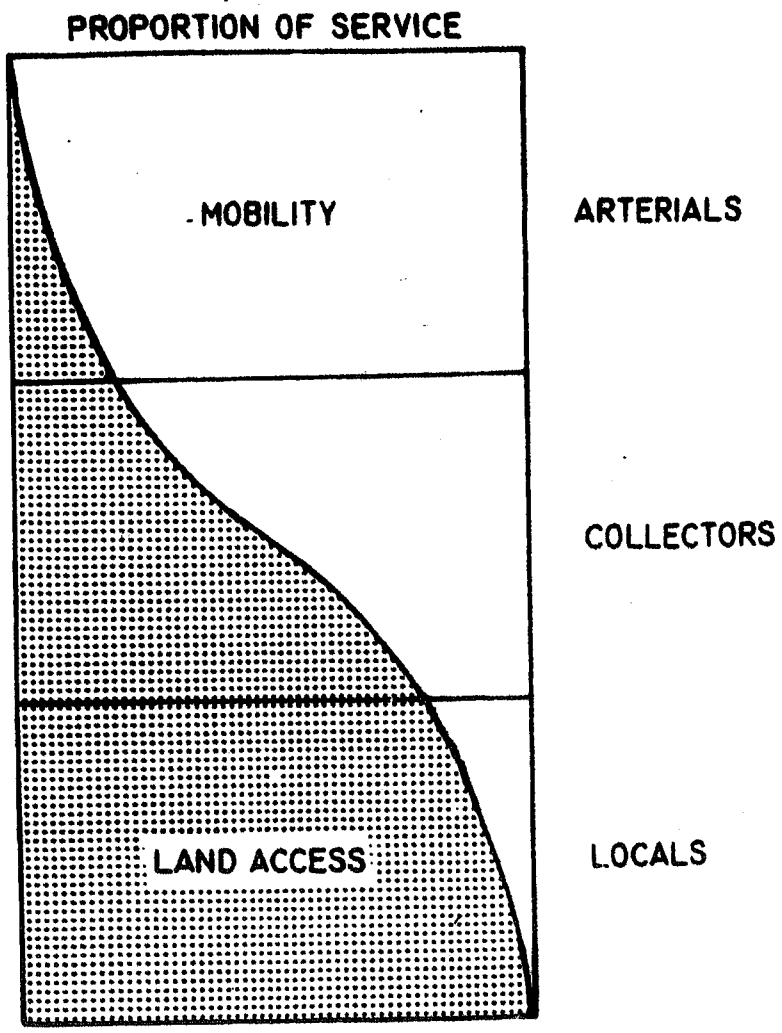
Access management regulates access to land development while preserving traffic flow. It focuses on managing existing roadways more efficiently and effectively. Effective access standards and regulations benefit a community by reducing accidents, increasing capacity, improving air quality, providing better access to businesses, and improving mobility. Overall, safety is improved, congestion is reduced, and the life of a roadway is extended with little cost to taxpayers.

There is a hierarchy of roads that serves different needs (see Figure 1). The purpose of good roadway access is to maintain the design and function commensurate with each level of the roadway hierarchy. For example, arterials are dedicated to providing transportation between points (mobility) while local roads are dedicated to providing land access to local adjoining properties. Functional maintenance of the hierarchy is critical to maintaining overall system capacity and safety.

Most rural counties rely on the standards set forth in VDOT's *Minimum Standards of Entrances To State Highways* to facilitate the design for connections to public roads. As the title implies, these standards are minimum and not necessarily the most desirable. However, it is written in the manual, "In counties or cities which have ordinances for entrances which equal or exceed those of the Virginia Department of Transportation, then those of the county or city shall apply." This report incorporates higher standards than those presented in *Minimum Standards of Entrances To State Highways.*

Figure 1

RELATIONSHIP OF FUNCTIONALLY CLASSIFIED SYSTEMS IN SERVING TRAFFIC MOBILITY AND LAND ACCESS



Section 2. Intent and Purpose

The intent of these regulations and standards is to provide and manage access to land development, while preserving traffic flow in terms of safety, capacity, and speed. Major thoroughfares, including highways and other arterials, serve as the primary network for moving people and goods. These transportation corridors also provide access to businesses and homes and have served as the focus for commercial and residential development. If access systems are not properly designed, these thoroughfares will be unable to accommodate the access needs of development and retain their primary transportation function. These regulations and standards balance the right of access to private property, with the right of the public to safe and efficient travel.

State and local thoroughfares have been categorized by function and classified for access purposes based upon their level of importance. Regulations have been applied to these thoroughfares for the purpose of reducing traffic accidents, personal injury, and property damage and to thereby improve the safety and operation of the roadway network. This will protect the substantial public investment in the existing transportation system and reduce the need for expensive remedial measures. These regulations also further the orderly layout and use of land, protect community character, and conserve natural resources by promoting well-designed road and access systems.

Section 3. Applicability

These access management regulations and standards shall apply to all arterials, collectors, and local roadways within the county and to all properties that abut these roadways. The access classification system and standards shall apply to all roadways in the county.

Section 4. Conformance with Plans, Regulations, and Statutes

These access regulations and standards are adopted to implement Section 3 (c)- Goals and Policies and Actions as set forth in the 1998-2018 Powhatan County Comprehensive Plan. These include:

1) Managing vehicular access and land use changes along all major public roadways, particularly collectors and arterial roads in order to maintain suitable level of capacity and safety on roads.
2) Maintaining the overall efficiency and viability of the county's road network by creating and maintaining an interconnected system made up of hierarchy of local, collector, arterial and limited access roads.
3) Implementing standards and regulations to enhance access policies along Route 60.
4) Encouraging the consolidation and assemblage of existing small parcels along all major arterial and collector roadways, in order to achieve coordinated development with fewer entrances and greater setback.

In addition, these regulations and standards conform to the major transportation goals described by the Metropolitan Planning Organization (MPO) as specified in the adopted Long-Range Transportation Plan and the planning policies of the Virginia Department of

Transportation. The report also conforms with the policy and planning directives of the federal Transportation Equity Act for the Twenty-first Century (TEA-21) to preserve safety, promote efficient system management, and preserve the existing transportation system.

Section 5. Definitions

The following terms have the following meaning unless the content clearly indicates otherwise:
"AASHTO" means American Association of State Highway and Transportation Officials.

"Access" means to provide vehicular or pedestrian entrance or exit to a property.

"Access connection" means any driveway or other point of entry and/or exit such as a street, road, or highway that connects to the general street system.

"Applicant" means any person, corporation, entity or agency applying for an access permit.

"Auxiliary lane" means a full lane section and a taper (transition) section.

"Capacity" means the ability of the highway to provide service to the volume of vehicles seeking to use the highway. Capacity is most often considered the maximum amount of traffic that can be accommodated by a highway during the peak hours of demand. Sometimes it refers to the entire roadway, and sometimes to a single lane.

"Commercial Entrance" means an entrance serving all access points other than an individual private residence. A residential subdivision entrance is a commercial entrance.

"Connection Spacing" means the distance between connections, measured from the closest edge of pavement of the first connection to the closest edge of pavement of the second connection along the edge of the traveled roadway.

"Corner Clearance" means the distance from an intersection to the nearest driveway.

"Cross Access" means a service drive providing vehicular access between two or more contiguous sites so that the driver need not enter the public street system.

"Design Speed" means the maximum safe speed that can be maintained over a specified section of highway when conditions are so favorable that the design features of the highway govern, as defined in the latest edition of AASHTO's *A Policy on Geometric Design of Highways and Streets.*

"Driveway" means an access that is not a public street, road, or highway.

"Frontage Road" means a public or private street or road auxiliary to and normally alongside and parallel to the main highway, constructed for the purposes of maintaining local road continuity and the controlling of direct access to the main highway while providing access to private properties.

"Functional Classification" means a classification system that defines a public roadway according to

its purposes and hierarchy in the state highway system.

"Lane" means the portion of a roadway for the movement of a single line of vehicles. It does not include the gutter or shoulder of the roadway.

"Powhatan Government" means the County Board of Supervisors.

"Lot" means a parcel of land whose boundaries have been established by some legal instrument.

"Lot, Depth" means the average distance measured from the front lot line to the rear lot line.

"Lot, Frontage" means that portion of a lot extending along a street right-of-way line.

"Lot, Width" means the horizontal distance between side lot lines measured parallel to the front lot line at the minimum required front setback line.

"Median" means that portion of a highway separating the opposing traffic flows.

"Outparcel" means a parcel of land abutting and external to the larger, main parcel, which is under the same ownership and has roadway frontage.

"Private Subdivision Road" means a road that serves more than one individual property, is privately owned and maintained, and requires a commercial entrance permit.

"Right-of-Way" means land reserved, used, or to be used for a highway, street, alley, walkway, drainage facility, or other public purpose.

"Service Road" means a public or private street or road, auxiliary to and normally located parallel to a controlled access facility that maintains local road continuity and provides access to parcels adjacent to the controlled access facility. Also see Frontage Road.

"Shared Access" means a driveway connecting two or more contiguous sites to the public street system.

"Sight Distance" means the distance visible to the driver of a vehicle measured along the normal travel path of a roadway from a designated location and to a specified height above the roadway when the view is unobstructed by traffic. For crossovers and commercial entrances, Sight distance is the distance measured between the height of the driver's eye (3.5 ft) and the height of an object (4.25 ft) without horizontal or vertical obstruction to the line of sight.

"Stopping Sight Distance" means the distance required by a driver of a vehicle, traveling at a given speed, to bring the vehicle to a stop after an object on the roadway becomes visible. It includes the distance traveled during driver perception and reaction times and the vehicle braking distance.

"Storage Lane" means the full lane width portion of an auxiliary lane to store the maximum number of vehicles from interfering with the function of the through travel lanes.

"Stub Road" means a portion of street or right-of-way access drive used as an extension to an abutting property that may be developed in the future.

"Subdivision" means to divide land into two or more smaller lots or parcels.

"Taper" means the widening of pavement to allow the redirection and transition of vehicles around or into an auxiliary lane.

"Trip" means a single or one-direction vehicle movement with either the origin or the destination inside a study area. A vehicle leaving the highway and entering a property is one trip. Later when the vehicle leaves the property and reenters the highway, it is a second trip.

"Turn Lane" means an auxiliary lane that provides deceleration, so that disruption to through traffic is minimized, and provides adequate storage outside of the through lane which the turn is being made.

"Warrant(s)" means the criteria by which the need for an improvement can be determined.

Section 6. Access Categories

Since different roads serve different purposes, a ranking system for roadways in Powhatan County has been developed to determine the appropriate application of designs and strategies. These categories are based on the adopted functional classification of roadways specified on the County's Thoroughfare Map. The roadways are assigned to one of five access categories with Access Category 1 being the most restrictive and Access Category 5 being the least restrictive. The categories are as follows:

Access Category 1: Interstate and Limited Access/Primary Systems (i.e., Route 288)

Characteristics:

- High-speed
- High traffic volumes
- Strong emphasis on mobility for through traffic
- Long distance travel
- No right to direct access

Access Category 2: Major Arterials/Primary System (i.e., Route 60 and Route 522)

Characteristics:

- Highways that supplement the federal interstate system
- Highly controlled access
- Service to abutting property is subordinate to the safe, efficient, and effective movement of through traffic
- Emphasis on mobility
- Probability that the significant land use change in the future is high

Access Category 3: Minor Arterials /Primary, Secondary Systems (i.e., Route 13)

Characteristics:

- Emphasis on preserving safety and capacity of roadway
- Probability that the significant land use change in the future is high
- Service to abutting property is subordinate to the safe, efficient, and effective movement of through traffic

Access Category 4: Collectors /Primary, Secondary Systems (i.e., Route 714)

Characteristics:

- Probability that the significant land use change in the future is high for undeveloped areas
- Direct access must be balanced against mobility
- Emphasis on improving existing conditions by encouraging coordinated access
- Generally moderate to low traffic volumes

Access Category 5: Local Roads /Secondary System (i.e., Route 620)

Characteristics:

- Provide access to arterials and collectors
- Not intended for long trips
- Trips are local in nature
- Generally low traffic volumes

Section 7: Access Standards: Driveway, Corner Clearance, Crossover, and Signalized Intersection Spacing

1. All access connections on roadway segments that have been assigned an access category shall meet the minimum connection spacing requirements of that category, as specified in Table 1. The access standards presented in Table 1 limit the number of driveways/crossovers/signalized intersections on a road by mandating minimum separation distances between them. This reduces the potential for collisions as travelers enter or exit the roadway and encourages sharing of access, where appropriate. The spacing standards in Table 1 have been designed to provide adequate sight distance, stopping response times, and stacking space for turning movements.

2. Driveway spacing shall be measured from the closest edge of the pavement to the next closest edge of the pavement (refer to Figure 2 for points of measurements).

3. Corner clearance for connections shall be measured from the closest edge of pavement of the intersection to the next closest edge of pavement of the first access point from the intersection (refer to Figure 2).

4. If the access connection spacing standards in Table 1 can not be achieved, the Director of Planning may reduce required separation distances of access points provided that:

a) Shared access driveways and cross access easements are provided wherever feasible in accordance with Section 9; or

TABLE 1- Powhatan County Recommended Access Design Standards

(minimum in feet)

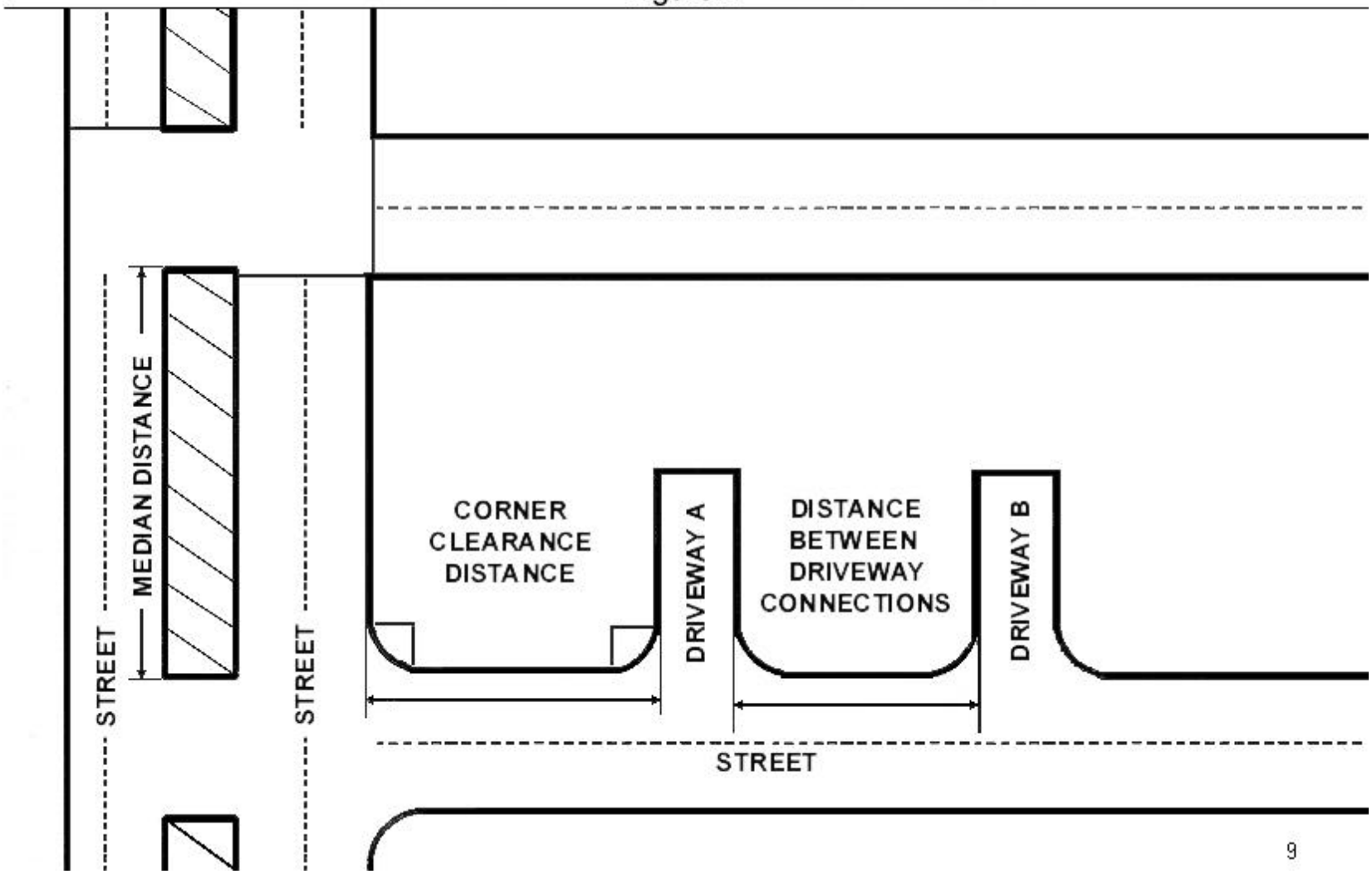
Access Category	Functional Class	Driveway Spacing & Corner Clearance		Crossover Spacing	Signal Spacing
		>45mph	<=45mph		
2	Major Arterials (Primary)	625 (1)	440 (2)	2640 (2)	2640 (2)
3	Minor Arterials (Primary/ Secondary)	625(1)	440 (2)	1320 (2)	2640 (2)
4	Collectors (Primary/ Secondary)	440 (2)	245 (2)	1320 (2)	1320 (2)
5	Local Roads (3)	245	200 (1)	N/A	NA

1. American Association of State Highway and Transportation Officials (AASHTO)
2. Institute of Transportation Engineers (ITE)
3. Does not include cul-de-sac streets, dead-end roads or subdivision streets

***Category 1 Standards (Interstate and Limited Access) are determined by VDOT.**

ACCESS DESIGN

Figure 2



b) The connection does not create a safety or operational problem upon review of a site specific traffic impact analysis of the proposed connection prepared by a registered engineer or other professional acceptable to the Director of Planning and submitted by the applicant; or

c) At an intersection, where no other access to the property is available and shared access driveways and cross access easements are not feasible, the Director of Planning may allow construction of an access connection along the property line farthest from the intersection. In such cases, directional connections (i.e., right in/out) may be required.

Section 8. Subdivision of Land Along Corridors

1. All land in a parcel having a single tax code number, as of *(date of adoption)*, shall be entitled one (1) driveway/connection per parcel as of right on said public thoroughfares(s). When subsequently subdivided, access to all newly created lots shall be provided via the permitted access connection. This may be achieved through subdivision roads, shared and cross accesses, and service drives (see Figure 3).

a) Parcels in existence as of *(date of adoption)* with frontages that exceed minimum spacing requirements as shown in Table 1 may be permitted additional access connections.

b) Additional access connections may be allowed where the property owner can demonstrate upon review of a traffic impact analysis of the proposed connection submitted by the applicant that safety and efficiency of travel on the thoroughfare will be improved by providing more than one access to the site.

Section 9. Shared and Cross Access

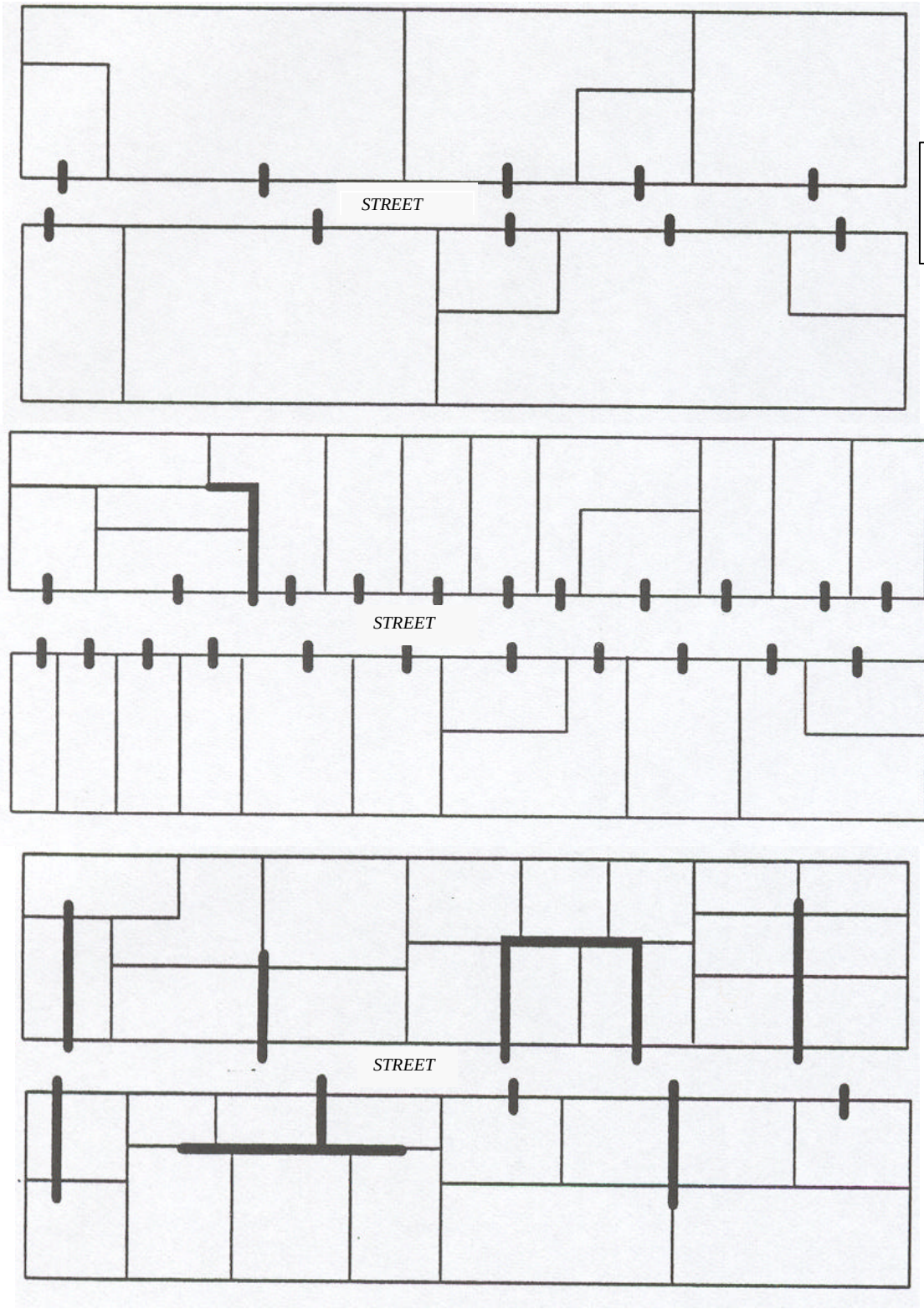
1. Adjacent commercial or office properties classified as major traffic generators (i.e., shopping center, office parks) shall provide cross access and pedestrian access to allow circulation between sites.

Commentary: Adjacent shopping centers or office parks are often not connected by a service drive and sidewalk. As a result, customers who wish to shop in both centers or visit both sites must exit the parking lot of one, travel a short distance on a major thoroughfare, and then access the next site. A cross access drive reduces traffic on the major thoroughfare and reduces safety hazards. This in turn can have positive business benefits by providing easy access to one site from another.

2. A system of shared use driveways and cross access easements shall be established wherever feasible and the building site shall incorporate the following:

a) A continuous service drive or cross access extending the entire length of each block

Figure 3: Potential Results from Access Management



Permitted access before adoption of Access Management

Potential subdivision and access without Access Management

Potential subdivision and access after adoption of Access Management (i.e., shared and cross access, reverse frontage, spacing requirements)

served to provide for driveway separation consistent with the access classification system and standards.

b) Sufficient width to accommodate two-way travel aisles designed to accommodate automobiles, service vehicles, and loading vehicles.

c) Stub roads and other design features to make it visually obvious that the abutting properties may be tied in to provide cross access via a service drive.

d) A unified access and circulation system plan that includes coordinated or shared parking areas is encouraged.

3. Pursuant to this section, the owner shall record an easement with the deed allowing cross access to and from other properties served by the shared use driveways and cross access or service drives.

4. Subdivisions with frontage on the state highway system shall be designed into shared access points to and from the highway.

Section 10. Access Connection and Driveway Design

1. Driveway width shall meet the following guidelines:

a) If the driveway is a one way in or one way out drive, then the driveway shall be a minimum width of 14 feet of pavement and shall have appropriate signage designating the driveway as a one-way connection.

b) For two-way access, each lane shall have a width of 12 feet.

c) Driveways that enter the major thoroughfare at traffic signals must have at least two outbound lanes (one for each turning direction) of at least 12 feet width and one inbound lane with a 14 feet width of pavement.

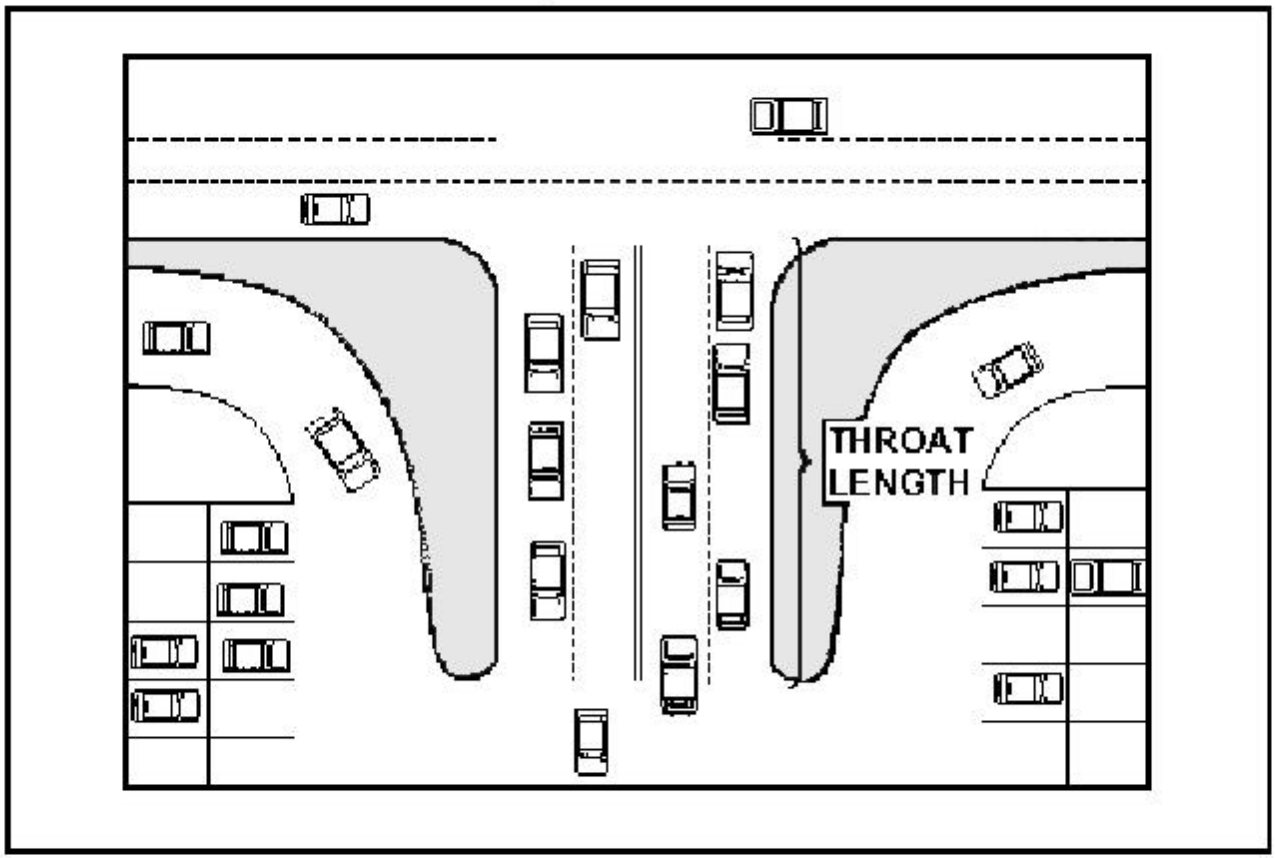
2. Driveway grades, turnout radii, approaches, and lengths shall conform to VDOT's standards.

a) Driveway approaches must be designed and located to provide an exiting vehicle with an unobstructed view. Construction of driveways along acceleration or deceleration lanes and tapers is prohibited.

b) The length of driveways or "throat length" shall be designed in accordance with the anticipated storage length for entering and exiting vehicles to prevent vehicles from backing into the flow of traffic on the public street or causing unsafe conflicts with on-site circulation (refer to Figure 4). These measures generally are acceptable for the principle access to a property and are not intended for any minor supplemental driveways to that same property.

DRIVEWAY THROAT LENGTH

Figure 4



Section 11. Requirements for Outparcels and Phased Development Plans

1. In the interest of promoting unified access and circulation systems, development sites under the same ownership or consolidated for the purposes of development and comprised of more than one building site shall not be considered separate properties in relation to the access standards and regulations. The number of connections permitted shall be the minimum number necessary to provide adequate access to these properties, not the maximum available for that frontage. All necessary easements, agreements, and stipulations required under Section 9 shall be met. This shall also apply to phased development plans. The owner and all lessees within the affected area are responsible for compliance with the requirements of these access standards and regulations.

2. All access to the outparcel must be internalized using the shared circulation system of the principal development or retail center. Access to outparcels shall be designed to avoid excessive movement across parking aisles and queuing across surrounding parking and driving aisles.

Commentary: Essentially this section states that adjacent properties under single ownership will be treated as one property.

Section 12. Reverse Frontage

1. Access to double frontage lots shall be encouraged on the street with the lower functional classification.

2. When a residential subdivision is proposed, it shall be designed to provide through lots along public roads with access from an interior subdivision road as required by the county's subdivision ordinance. A buffer yard may be required at the rear of through lots to buffer residences from traffic on the roadway. The buffer yard shall not be located within the public right-of-way.

Section 13. Connectivity

1. The street system of a proposed subdivision shall be designed to coordinate with existing, proposed, and planned streets outside of the subdivision as provided in this section.

2. Wherever a proposed development abuts unplatted land or a future development phase of the same development, street stubs shall be provided as deemed necessary by the county to provide access to abutting properties or to logically extend the street system into the surrounding area. The restoration and extension of the street shall be the responsibility of any future developer of the abutting land.

Section 14. Interchange Areas on Limited Access Facilities (Route 288)

1. To protect the safety and operational efficiency of the limited access facility and the interchange area, the distance to the first access connection along Route 711 (Huguenot Trail) from the interchange area (measured from the end of the taper of the ramp for that quadrant of the interchange) should be at least 625 feet where the posted speed limit is greater than 45 mph

or 440 feet where the posted speed limit is 45 mph or less.

Commentary: New highway interchanges can impact land development patterns around the interchange area. In turn, if land development is not properly planned it can create safety hazards and interfere with the flow of traffic onto and off of the interchange.

Section 15. Nonconforming Access Features

1. Permitted access connections in place as of *(date of adoption)* that do not conform with the standards herein shall be designated as nonconforming features and shall be brought into compliance with applicable standards under the following conditions:

a) When new access connection permits are requested;

b) Increase in trip generation of 100 or more additional peak hour trips; or

c) As roadway improvements allow.

Commentary: Nonconforming access features may continue in the same manner after adoption of land development regulations— a process known as "grandfathering". This protects the substantial investment of property owners and recognizes the expense of bringing those properties into conformance. Yet the negative impacts of nonconforming properties may be substantial, depending upon the degree of nonconformity. Nonconforming properties may pose safety hazards, increase traffic congestion, reduce property values, degrade the environment, and undermine community character. To address the public interest in these matters, land development regulations include conditions or circumstances where nonconforming features must be brought into conformance. It is essential that these standards be consistently and rigorously applied and enforced and that data and other information supporting these decisions be well documented.

2. If the principal activity on a property with nonconforming access features is discontinued for a consecutive period of two (2) years or discontinued for any period of time without a present intention of resuming that activity, then that property must thereafter be brought into conformity with all applicable connection spacing and design requirements, unless otherwise exempted by the permitting authority. If the activity is discontinued and renewed with a different activity, property owner must provide a traffic impact analysis to show that the new activity will not increase the number of trips.

Section 16. Traffic Impact Analysis

1. Traffic impact analyses (TIAs) are studies of the transportation needs and traffic impacts of a development at build-out on the surrounding road network and should be an integral part of the site development review process. TIAs should be conducted by registered professional

traffic engineers and reviewed and approved by the county. A complete analysis should be performed for each of the following situations:

a) All developments that can be expected to generate more than 250 total new peak-hour vehicle trips on the adjacent street or for a lesser volume when a review of the site plan indicates the need for additional data based on the latest edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual. Table 2 below shows peak hour calculations for several common uses using the procedures in this manual.

b) In some cases, a development that generates less than 250 new peak-hour trips should require a TIA if it affects local problem areas such as high accident locations or heavily congested areas.

c) When the original TIA is more than two years old, access decisions are still outstanding, and changes in development have occurred in the site environs.

Table 2- Peak Hour Calculations for Common Uses

ADT of 3,000

Land Use #	Description	Units or Sq.Ft.	AM Peak Hour (7 To 9 AM) Enter	Exit	Total	PM Peak Hour (4 to 6 PM) Enter	Exit	Total	ADT
210	Single-Family Detached	318	58	174	232	195	109	304	3,000
710	General Office Building (s.f.)	289,200	383	52	435	69	334	403	3,000
820	Shopping Center (s.f.)	27,900	46	29	75	130	140	270	3,000

ADT of 5,000

Land Use #	Description	Units or Sq.Ft.	AM Peak Hour (7 To 9 AM) Enter	Exit	Total	PM Peak Hour (4 to 6 PM) Enter	Exit	Total	ADT
210	Single-Family Detached	553	99	298	397	321	180	501	5,000
710	General Office Building (s.f.)	562,500	650	89	739	121	589	710	5,000
820	Shopping Center (s.f.)	61,750	73	47	120	219	238	457	5,000

ADT of 10,000

Land Use #	Description	Units or Sq.Ft.	AM Peak Hour (7 To 9 AM) Enter	Exit	Total	PM Peak Hour (4 to 6 PM) Enter	Exit	Total	ADT
210	Single-Family Detached	1,175	208	624	832	633	356	989	10,000
710	General Office Building (s.f.)	1,387,000	1,335	182	1,517	278	1,356	1,634	10,000
820	Shopping Center (s.f.)	181,500	139	89	228	447	484	931	10,000

Source: Trip Generation, 6th Edition

2. The Planning Director has the discretion to waive the requirement of a traffic impact analysis when it is determined that improvements needed to the road network caused by the proposed development are obvious without an analysis, and the developer agrees to participate in the cost of these improvements.

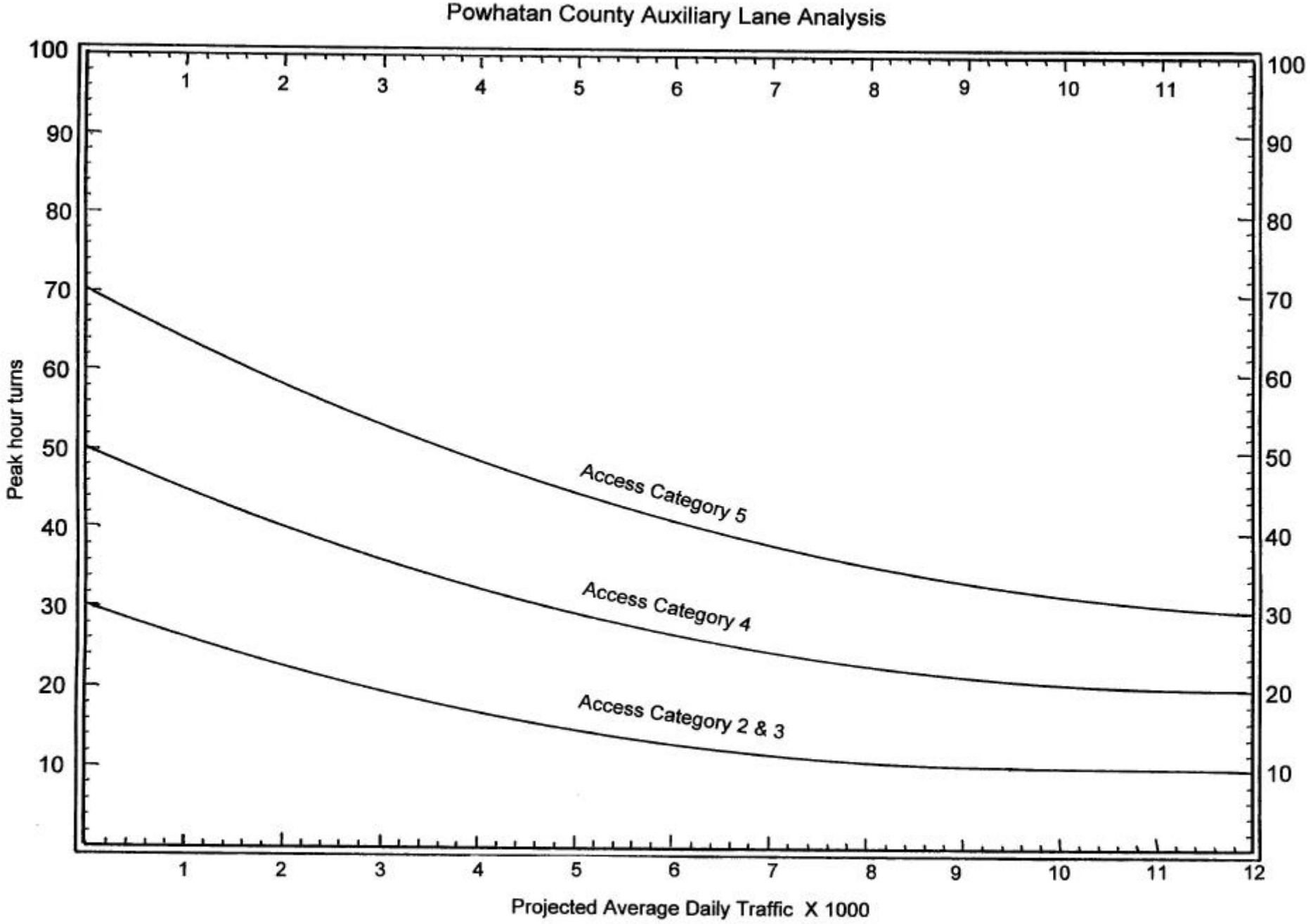
Section 17. Auxiliary Lane Warrants

Auxiliary lanes (right and left turn lanes and acceleration lanes) reduce the slowing and stopping

of traffic that is caused by turning vehicles. The purpose of the auxiliary lane is to enhance motorist safety and to prolong the intended through function of the major route. Auxiliary lanes are desirable features on any road, but are more important on higher roadway classifications.

The lanes are needed wherever the volume of traffic turning at a site is high enough in relation to the through traffic to constitute a potential for disruption. This determination is commensurate to the access category of the road being entered. To ensure that the roadway is preserved for future use and not just current conditions, the future average daily traffic volumes (FADT) of the fronting road is used rather than present day average daily traffic volumes (PADT) (refer to Appendix A). Likewise, the number of turns being made at the time the site is completely built is used to assess the need for auxiliary lanes in the case of phased developments. To determine when an auxiliary lane is warranted see Figure 5. Refer to Appendix B for procedures on calculating right and left turns and determining the justification of the lane. The storage, deceleration, and transition lengths are in accordance with current VDOT design criteria.

Acceleration lanes are required when the number of right turns exiting a site are 200 turns per hour or greater on Access Category 2 & 3 roads. Channelized free right turn lanes are required on Access Category 2 & 3 roads if the projected number of right turns entering or exiting a site are 300 right turns per hour at non-signalized intersections or 200 right turns per hour at signalized intersections. Double left turn lanes are required if the number of left turns entering the site at a signalized point of access is 300 left turns per hour on any roadway.


Powhatan County Auxiliary Lane Analysis
Peak hour turns
Projected Average Daily Traffic X 1000
Access Category 5
Access Category 4
Access Category 2 & 3
100
90
80
70
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Section 18. Site Plan/Subdivision Plan Review Standards

1. In addition to the existing county site plan and subdivision plat review, applicants shall submit the information listed below for review by the Planning Department:

a) Location of all properties' access point(s) on both sides of the road where applicable.

b) Location of all proposed and existing access points for the site.

c) Plat map showing property lines, right-of-way, and ownership of abutting properties.

d) Distances to neighboring existing exit/entrance points, median openings, traffic signals, intersections, and other transportation features on both exit/entrance sides of the property.

e) Number and direction of lanes to be constructed on the driveway.

f) All planned transportation features (such as auxiliary lanes, signals, etc.).

g) Trip generation data or appropriate traffic studies.

h) Parking and internal circulation plans.

i) A detailed description of any requested variance and the reason the variance is requested.

Commentary: The subdivision and site plan review process provides local governments with the most effective opportunity for addressing access considerations and preventing access problems before they occur. This should be done as early as possible in the process. Developers will be far less amenable to revising the access plan later in the process or after the site plan or plot has been approved.

2. The county reserves the right to require traffic and safety analysis where safety is or may be an issue or where significant problems already exist. (Refer to Section 16.)

Section 19. Variance

1. The Planning Commission may authorize a variance to the application of these access standards and regulations. The granting of a variation shall be in accordance with the purpose and intent of these standards and regulations and shall not be considered until every feasible option for meeting access standards is explored.

2. Applicants for a variance from these standards and regulations must provide proof of

unique or special conditions that the strict application of the provisions would deny all reasonable access; endanger public health, welfare or safety; or cause an exceptional and undue hardship on the applicant, as distinguished from a special privilege or convenience sought by the applicant. This shall include proof that:

a) Indirect or restricted access cannot be obtained.

b) No engineering or construction solutions can be applied to mitigate the condition.

c) No alternative access is available from a street with a lower functional classification than the primary roadway.

3. No variance shall be authorized until there has been notice and a public hearing as required by §15.2-2204 of the Code of Virginia.

Section 20. References

A Policy on Geometric Design of Highways and Streets, 1994. American Association of State Highway and Transportation Officials, Suite 225, 444 North Capitol Street, Washington, D.C. 20001, as amended.

"Access Management Guidelines for Activity Centers," NCHRP Report 348, 1992, National Academy Press, Washington, D.C.

Highway Capacity Manual, Special Report 209, 3rd Edition revised 1994, Transportation Research Board, Washington, D.C., as amended.

"Impacts of Access Management Techniques," NCHRP Report 420, 1999, National Academy Press, Washington, D.C.

Trip Generation Manual, Institute of Transportation Engineers, 6th edition.

Minimum Standards Of Entrances To State Highways, 1998, Virginia Department of Transportation.

Model Land Development & Subdivision Regulations That Support Access Management for Florida Cities and Counties, 1994, Center for Urban Transportation Research and Florida Department of Transportation.

Appendices

PRESENT AND FUTURE (2020) AVERAGE DAILY TRAFFIC VOLUMES
Categories 1-4

Route	Access Cat. (2)	From	To	Year	PADT (1)	2020 FADT (1)
13	3	Cumberland C.L.	Rt. 681	1996	1,900	4,263
13	3	Rt. 681	Rt. 645	1996	1,900	4,263
13	3	Rt. 645	Rt. 609	1996	4,100	7,532
13	2	Rt. 609	Rt. 1002	1996	4,100	7,055
13	3	Rt. 1002	Rt. 300	1996	4,100	7,055
13	3	Rt. 300	E. Rt. 60	1996	2,500	3,286
60	2	Cumberland C.L.	Rt. 630	1996	4,500	4,944
60	2	Rt. 630	Rt. 684	1996	5,700	7,686
60	2	Rt. 684	.63 MW Rt. 522	1996	5,700	7,686
60	2	.63 MW Rt. 522	Rt. 300Y	1996	13,000	21,637
60	2	Rt. 300Y	Rt. 13	1996	14,000	20,135
60	2	Rt. 13	Rt. 603	1996	14,000	19,134
60	2	Rt. 603	Rt. 622	1996	14,000	19,134
60	2	Rt. 622	Chesterfield C.L.	1996	19,000	29,825
288	1	Chesterfield C.L.	Goochland C.L.			
300	4	Rt. 1001	Rt. 300	1996	700	2,904
300	4	Rt. 13	Rt. 300	1996	1,100	1,669
300	4	Rt. 300	Rt. 60	1996	1,100	1,415
522	2	Rt. 60	Rt. 711	1996	6,400	12,555
522	2	Rt. 711	Goochland C.L.	1996	5,600	15,754
603	4	W. Rt. 604	Rt. 602	1995	382	709
603	3	Rt. 602	Rt. 13	1995	923	1,600
604	4	Amelia C.L.	E. Rt. 622	1995	2,317	3,942
604	4	E. Rt. 622	Chesterfield C.L.	1995	1,367	3,855
605	4	Rt. 622	Chesterfield C.L.	1995	711	1,101
607	4	Chesterfield C.L.	Rt. 711	1993	601	908
609	2	Amelia C.L.	Rt. 13	1995	1,403	2,422
613	4	Rt. 677	Rt. 723	1995	2,867	5,308
613	4	Rt. 723	Rt. 614	1995	2,867	6,039
614	4	Rt. 613	Rt. 711	1999	1,170	1,899
615	4	Rt. 522	W. Rt. 628	1993	825	1,554
615	3	W. Rt. 628	Rt. 711	1993	825	1,554
621	4	Rt. 684	Rt. 522	1993	498	847
622	3	E. Rt. 604	Rt. 634	1993	2,408	5,663
622	3	Rt. 634	Rt. 610	1995	1,751	5,150
622	3	Rt. 610	Rt. 60	1995	1,751	3,435
628	4	E. of Rt. 60	Rt. 614	1993	4,235	8,923
628	4	Rt. 614	Rt. 615	1993	2,312	6,491
629	4	Rt. 60	Rt. 630	1995	903	1,479
629	4	Rt. 630	Rt. 684	1995	711	1,320
634	4	Rt. 622	Rt. 676	1993	2,525	4,360
635	4	Rt. 675	Rt. 1301	1993	503	740
635	4	Rt. 1301	Rt. 711	1993	503	750

PRESENT AND FUTURE (2020) AVERAGE DAILY TRAFFIC VOLUMES
Categories 1-4

Route	Access Cat. (2)	From	To	Year	PADT (1)	2020 FADT (1)
675	4	Rt. 635	E. Rt. 60	1993	1,104	1,480
676	4	Rt. 634	E. Rt. 60	1993	1,972	3,335
677	4	Rt. 613	E. Rt. 60	1993	1,788	3,032
684	4	Rt. 60	Rt. 621	1993	1,314	1,809
684	4	Rt. 600 & 621	Rt. 629	1993	625	1,640
684	4	Rt. 629	Cumberland C.L.	1995	1,823	6,120
711	4	Rt. 522	Rt. 628	1993	2,833	5,370
711	4	Rt. 628	Rt. 615	1993	2,833	5,284
711	4	Rt. 615	Rt. 614	1999	3,360	5,503
711	4	Rt. 614	Rt. 635	1999	4,080	5,632
711	4	Rt. 635	Rt. 714	1993	4,702	9,968
711	4	Rt. 714	Chesterfield C.L.	1993	4,702	10,363
714	4	Chesterfield C.L.	Rt. 711	1995	1,311	2,416
1001	4	Rt. 13	Rt. 300Y	1993	243	344
1002	4	Rt. 13	Rt. 60	1995	2,591	3,811

Notes: ***1) Source: VDOT Statewide Highway Plan (Road Inventory)***
**** PADT= Present Day Average Daily Traffic Volumes***
**** FADT= Future Average Daily Traffic Volumes***
**** This inventory is in the process of being updated.***
**** FADT numbers were derived solely from trend analysis.***

2) Source: Powhatan County Thoroughfare Plan

3) Roads not shown on this list are Category 5 roads.

Appendix B- Trip Distribution and Turn Lane Worksheet
Source: VDOT

Powhatan County

Trip Distribution and Turn Lane Worksheet

Step

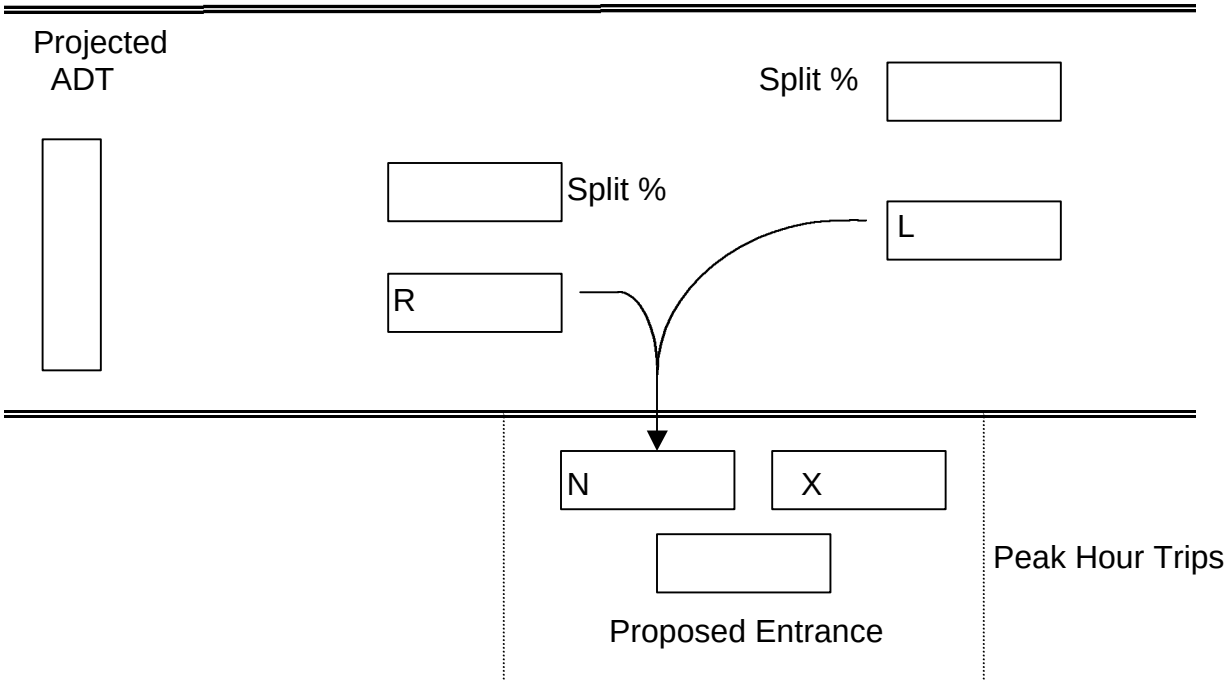
1- Define the land use and the peak hour trips generated by the site at full build-out from ITE's Trip Generation Manual or other recognized source.

2- Calculate the trips entering (Box N) and exiting (Box X) the site during the AM and PM peak hours, using the directional distribution found in the Trip Generation Manual. Round up to the next whole number.

3- Determine the number of right turn and left turn entry movements by using the split percentage (Split %) of the background traffic. If the background traffic is unknown, use 60%/40% as a rough estimate. Multiply the number of entering vehicles (Box N) by the Split% to obtain the peak hour site-generated left and right turns (Box L and Box R).

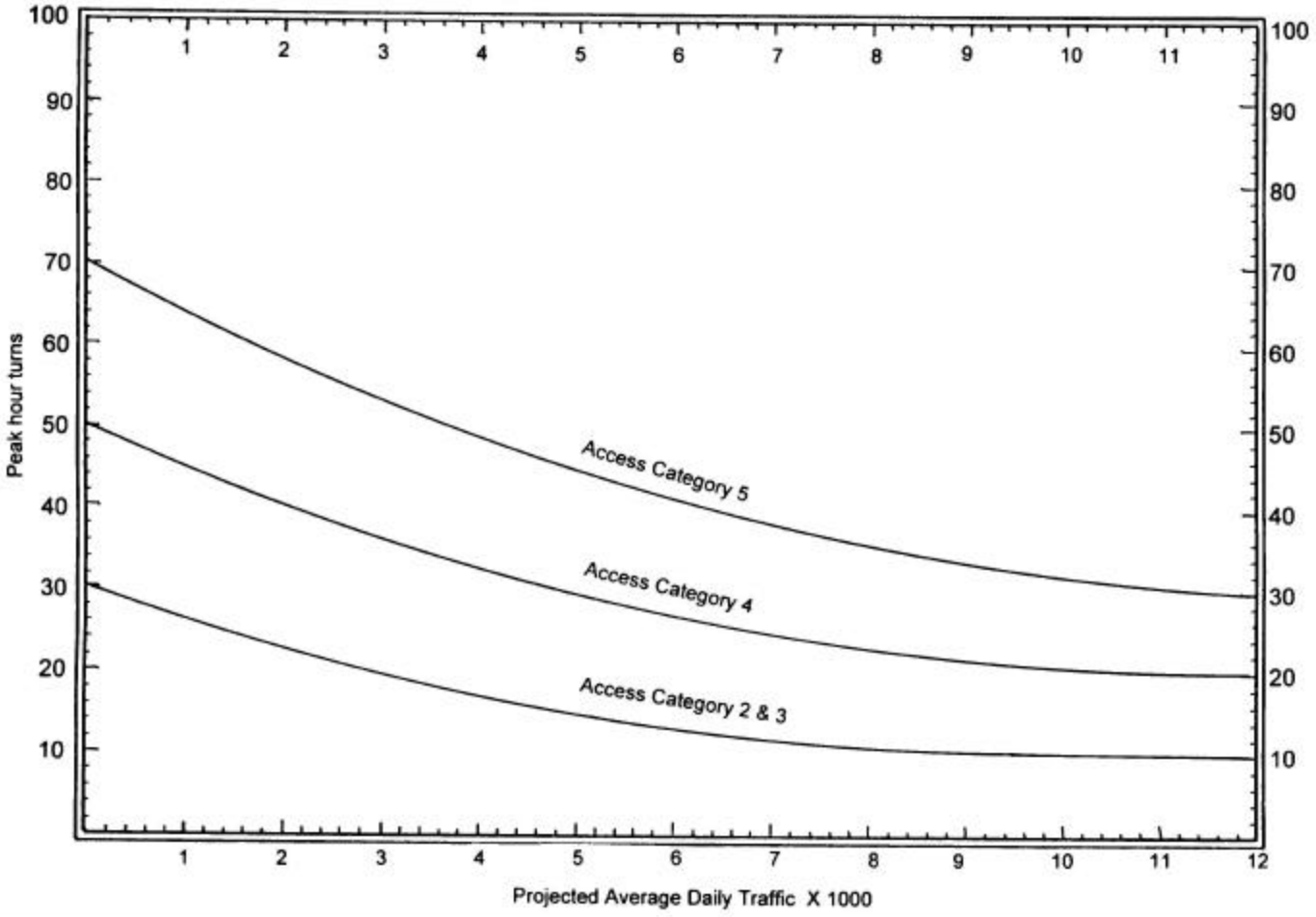
4- Right and left turn analyses may now be made by plotting Box L and Box R on the Y axis, labeled "Peak Hour Turns". Plot the projected ADT on the X axis of the Auxiliary Lane Analysis graph labeled "Projected Average Daily traffic X 1000". The Projected ADT and the road's access category are available from the Powhatan Planning Department.

5- If the intersection of the lines for the peak hour turns and projected ADT falls above the graph's line for the fronting road's access category, the auxiliary lane(s) is justified. If the intersecting lines fall below the fronting road's access category, then the auxiliary lane(s) is not justified.



Appendix B- Trip Distribution and Turn Lane Worksheet
Source: Virginia Department of Transportation

Powhatan County Auxiliary Lane Analysis



1. Calculate the peak hour trip ends generated by the site at full build-out by use of the current edition of I.T.E.'s Trip Generation Manual or other recognized source.

2. Assign the entry trips as right or left turns in accordance with the background traffic of the fronting road. If the background traffic is unknown, the turn lane worksheet may be used to provide a rough estimate.

3. Plot these peak hour right and left turn entry movements along the "Y" axis which is labeled "Peak Hour Turns."

4. Obtain the projected Average Daily Traffic (ADT) of the fronting road and its access category from the planning section. Plot the projected ADT along the "X" axis, which is labeled "Average Daily Traffic X 1000."

5. If the intersection of the lines for the peak hour turns and projected ADT falls above the line for the fronting road's access category, the auxiliary lane is justified.

Example 1-Residential Subdivision

Site Information:

Residential Subdivision, 75 lots (single family detached) located on the west side of Route 628 (Access Category 4), Assume ADT 3250

Example 2-Fast Food

Site Information:

Fast Food Restaurant with drive-through window, 3,500 sq. ft. located on the east side of Route 522 (Access Category 2), Assume ADT 9,000

Example 3-Day Care Center

Site Information:

Day Care, 4,500 sq. ft. located on the south side of Route 676 (Access Category 4), has a documented 55%-45% distributional split, Assume ADT 3,075

Example 4-Supermarket

Site Information:

Supermarket, 25,000 sq. ft., located on the south side of Route 60 (Access Category 2), documented 64%-36% split, Assume ADT 23,412

Appendix B- Trip Distribution and Turn Lane Worksheet
Source: VDOT

Powhatan County
Trip Distribution and Turn Lane Worksheet- EXAMPLE 1

Step

1- Define the land use and the peak hour trips generated by the site at full build-out from ITE's Trip Generation Manual or other recognized source.

Land Use Code: **210**
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**
Peak Hour of Adjacent Street Traffic
One Hour Between 4 p.m. and 6 p.m.
Average Rate: **1.01 (Trip Generation per Dwelling Unit)**
Directional Distribution: **64% entering, 36% exiting**

Proposed Entrance: **1.01 x 75 lots = 75.75 (round to 76)**

2- Calculate the trips entering (Box N) and exiting (Box X) the site during the AM and PM peak hours, using the directional distribution found in the Trip Generation Manual. Round up to the next whole number.

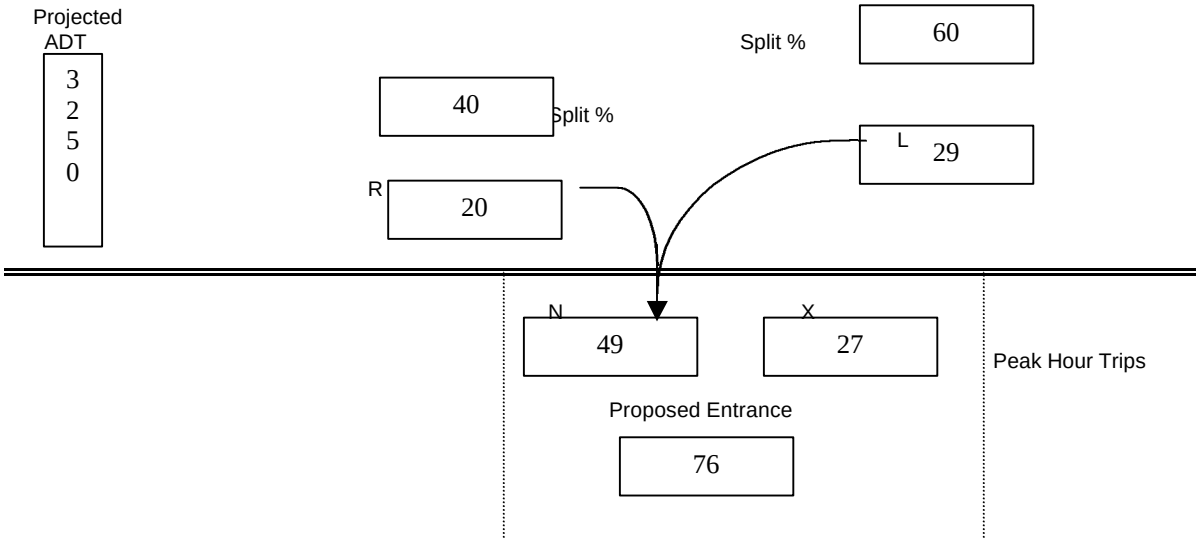
Trips Entering (Box N): **76 x .64 = 48.64 (round to 49)**
Trips Exiting (Box X): **76 x .36 = 27.36 (round to 27)**

3- Determine the number of right turn and left turn entry movements by using the split percentage (Split %) of the background traffic. If the background traffic is unknown, use 60%/40% as a rough estimate. Multiply the number of entering vehicles (Box N) by the Split% to obtain the peak hour site-generated left and right turns (Box L and Box R).

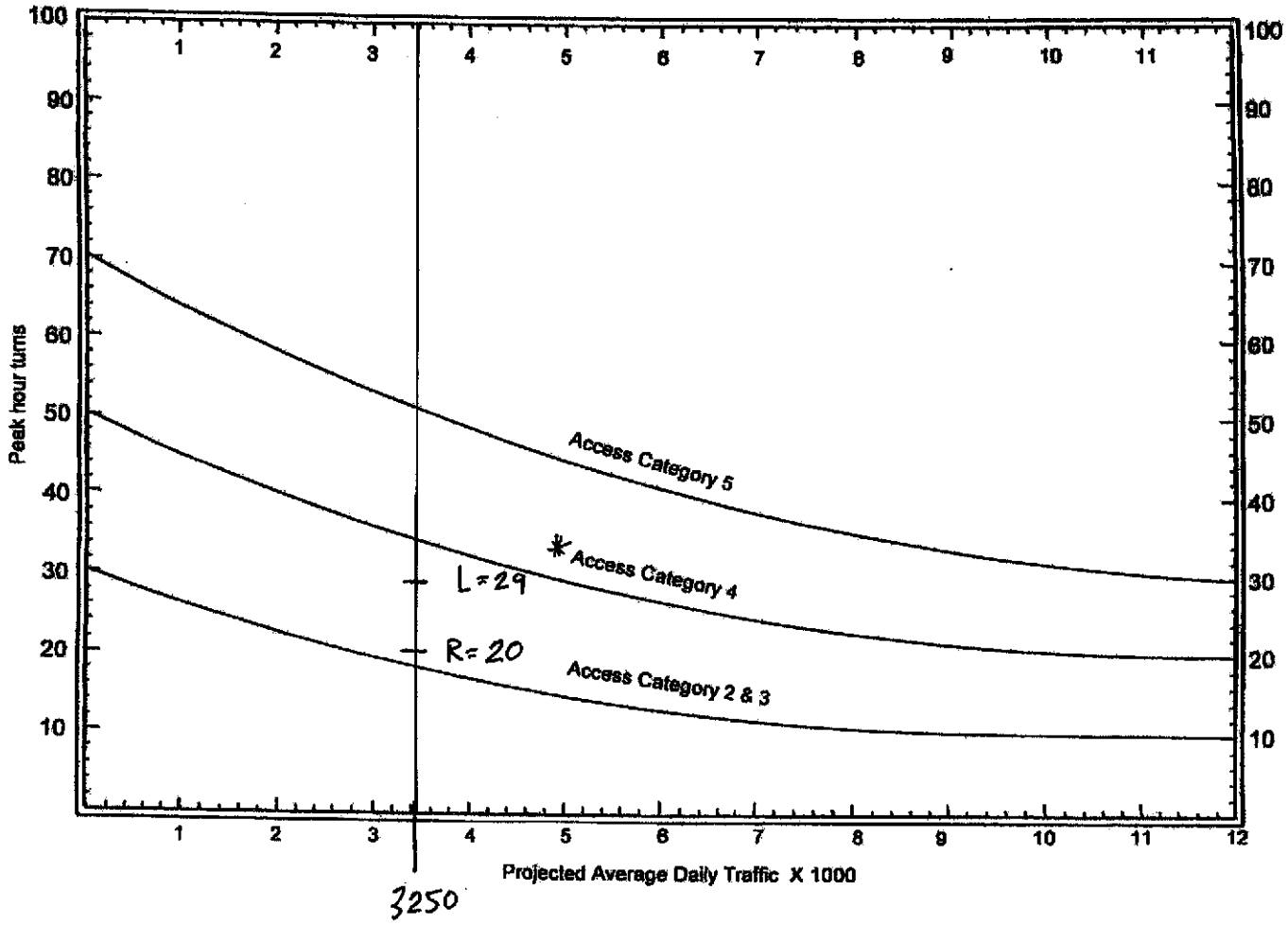
Right Turns (Box R) : **.40 x 49 = 20**
Left Turns (Box L): **.60 x 49 = 29**

4- Right and left turn analyses may now be made by plotting Box L and Box R on the Y axis, labeled "Peak Hour Turns". Plot the projected ADT on the X axis of the Auxiliary Lane Analysis graph labeled "Projected Average Daily traffic X 1000". The Projected ADT and the road's access category are available from the Powhatan Planning Department.
See Graph on Next Page

5- If the intersection of the lines for the peak hour turns and projected ADT falls above the graph's line for the fronting road's access category, the auxiliary lane(s) is justified. If the intersecting lines fall below the fronting road's access category, then the auxiliary lane(s) is not justified.
Since Rte. 628 is a Category 4 road and the peak hour turns plots fall below the Access Category 4 line, turn lanes are not justified.



Powhatan County Auxiliary Lane Analysis



1. Calculate the peak hour trip ends generated by the site at full build-out by use of the current edition of I.T.E.'s Trip Generation Manual or other recognized source.

2. Assign the entry trips as right or left turns in accordance with the background traffic of the fronting road. If the background traffic is unknown, the turn lane worksheet may be used to provide a rough estimate.

3. Plot these peak hour right and left turn entry movements along the "Y" axis which is labeled "Peak Hour Turns".

4. Obtain the projected Average Daily Traffic (ADT) of the fronting road, and its access category from the planning section. Plot the projected ADT along the "X" axis, which is labeled "Average Daily Traffic X 1000".

5. If the intersection of the lines for the peak hour turns and projected ADT falls above the line for the fronting road's access category, the auxiliary lane is justified.

Appendix B- Trip Distribution and Turn Lane Worksheet
Source: VDOT

Powhatan County
Trip Distribution and Turn Lane Worksheet- EXAMPLE 2

Step

1- Define the land use and the peak hour trips generated by the site at full build-out from ITE's Trip Generation Manual or other recognized source.

Land Use Code: **834**
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday**
Peak Hour of Adjacent Street Traffic, One Hour Between 7 a.m. and 9 a.m.
Average Rate: **49.86 (Trip Generation per 1000 Sq. Feet GFA)**
Directional Distribution: **51% entering, 49% exiting**

Proposed Entrance **3.5 tsgfa x 49.86 = 174.51 (round to 175)**

2- Calculate the trips entering (Box N) and exiting (Box X) the site during the AM and PM peak hours, using the directional distribution found in the Trip Generation Manual. Round up to the next whole number.

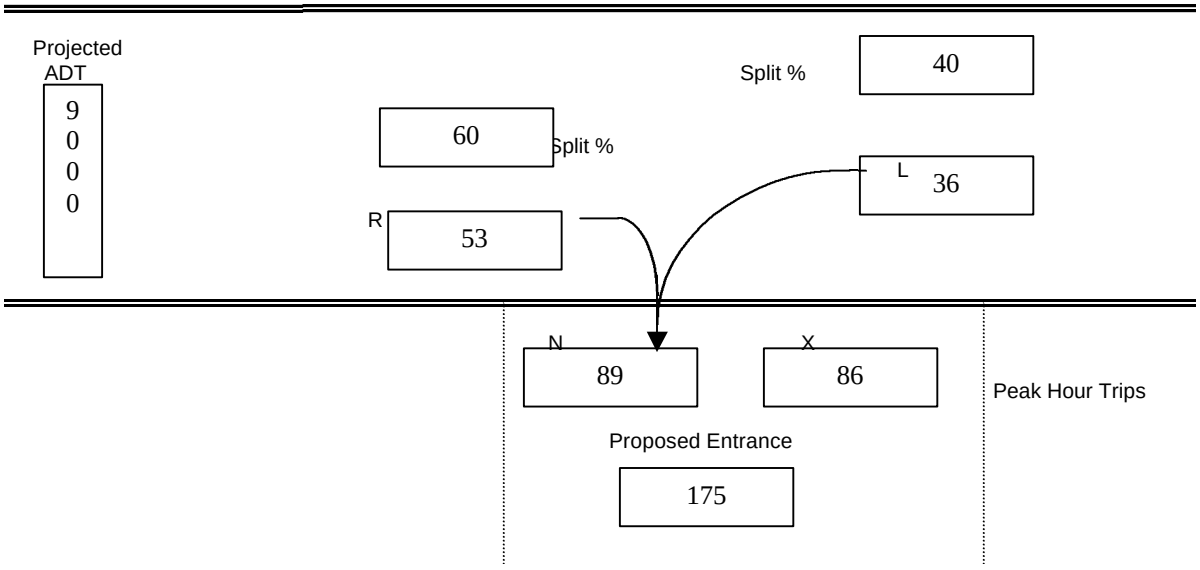
Trips Entering (Box N): **175 x .51 = 89**
Trips Exiting (Box X): **175 x .49 = 86**

3- Determine the number of right turn and left turn entry movements by using the split percentage (Split %) of the background traffic. If the background traffic is unknown, use 60%/40% as a rough estimate. Multiply the number of entering vehicles (Box N) by the Split% to obtain the peak hour site-generated left and right turns (Box L and Box R).

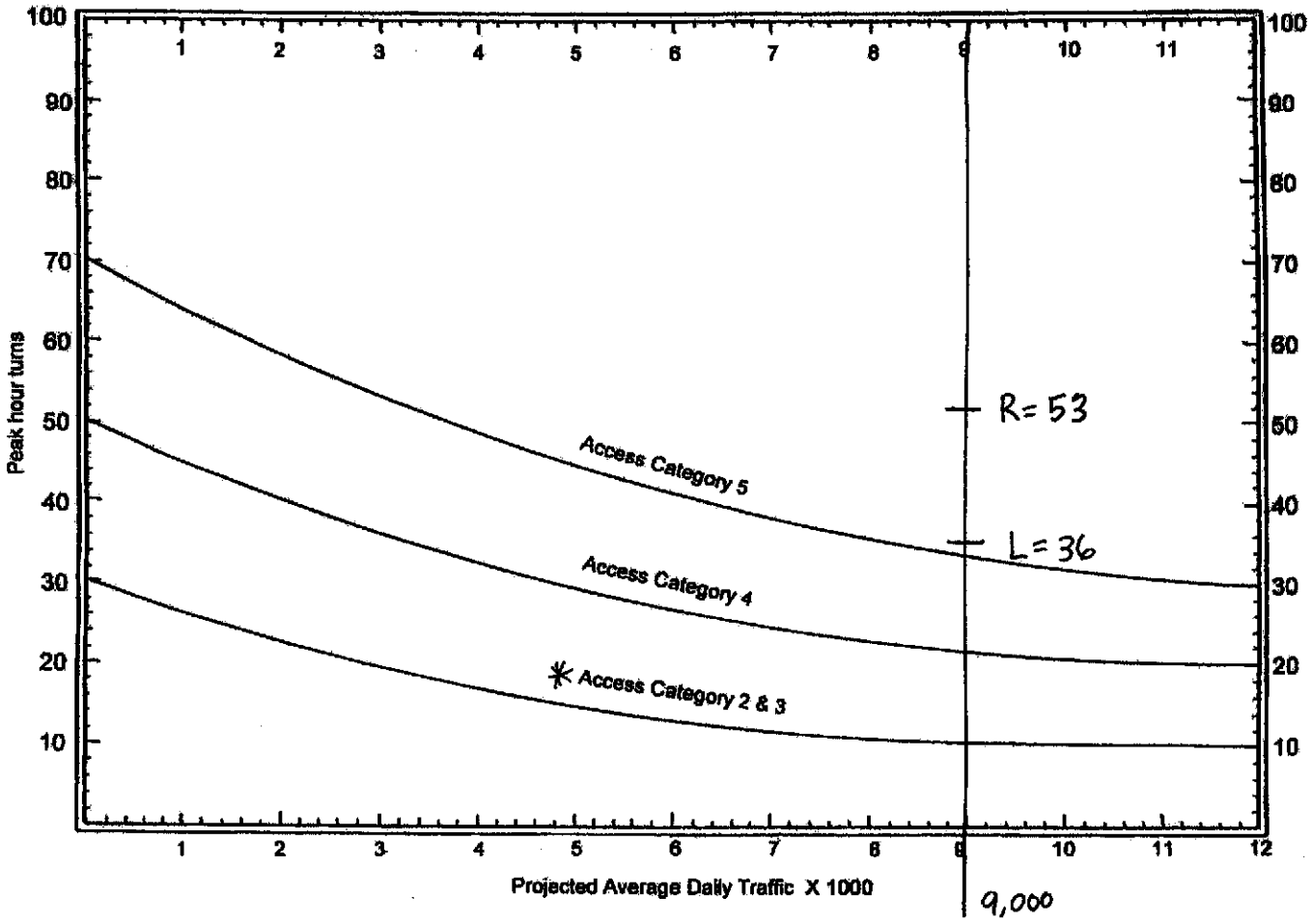
Right Turns (Box R): **.60 x 89 = 53**
Left Turns (Box L) **.40 x 89 = 36**

4- Right and left turn analyses may now be made by plotting Box L and Box R on the Y axis, labeled "Peak Hour Turns". Plot the projected ADT on the X axis of the Auxiliary Lane Analysis graph labeled "Projected Average Daily traffic X 1000". The Projected ADT and the road's access category are available from the Powhatan Planning Department.
See Graph on Next Page

5- If the intersection of the lines for the peak hour turns and projected ADT falls above the graph's line for the fronting road's access category, the auxiliary lane(s) is justified. If the intersecting lines fall below the fronting road's access category, then the auxiliary lane(s) is not justified.
Since Rte. 522 is a Category 2 road and the peak hour turns plots fall above the Access Category 2 line, turn lanes are justified.



Powhatan County Auxiliary Lane Analysis



1. Calculate the peak hour trip ends generated by the site at full build-out by use of the current edition of I.T.E.'s Trip Generation Manual or other recognized source.

2. Assign the entry trips as right or left turns in accordance with the background traffic of the fronting road. If the background traffic is unknown, the turn lane worksheet may be used to provide a rough estimate.

3. Plot these peak hour right and left turn entry movements along the "Y" axis which is labeled "Peak Hour Turns".

4. Obtain the projected Average Daily Traffic (ADT) of the fronting road, and its access category from the planning section. Plot the projected ADT along the "X" axis, which is labeled "Average Daily Traffic X 1000".

5. If the intersection of the lines for the peak hour turns and projected ADT falls above the line for the fronting road's access category, the auxiliary lane is justified.

Appendix B- Trip Distribution and Turn Lane Worksheet
Source: VDOT

Powhatan County
Trip Distribution and Turn Lane Worksheet- EXAMPLE 3

Step

1- Define the land use and the peak hour trips generated by the site at full build-out from ITE's Trip Generation Manual or other recognized source.

Land Use Code: **565**
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday**
P.M. Peak Hour of Generator
Average Rate: **13.94 (Trip Generation per 1000 Sq. Ft. GFA)**
Directional Distribution: **47% entering, 53% exiting**

Proposed Entrance: **4.5 tsgfax 13.94 = 62.73 (round to 63)**

2- Calculate the trips entering (Box N) and exiting (Box X) the site during the AM and PM peak hours, using the directional distribution found in the Trip Generation Manual. Round up to the next whole number.

Trips Entering (Box N): **63 x .47 = 29.61 (round to 30)**
Trips Exiting (Box X): **63 x .53 = 33.39 (round to 33)**

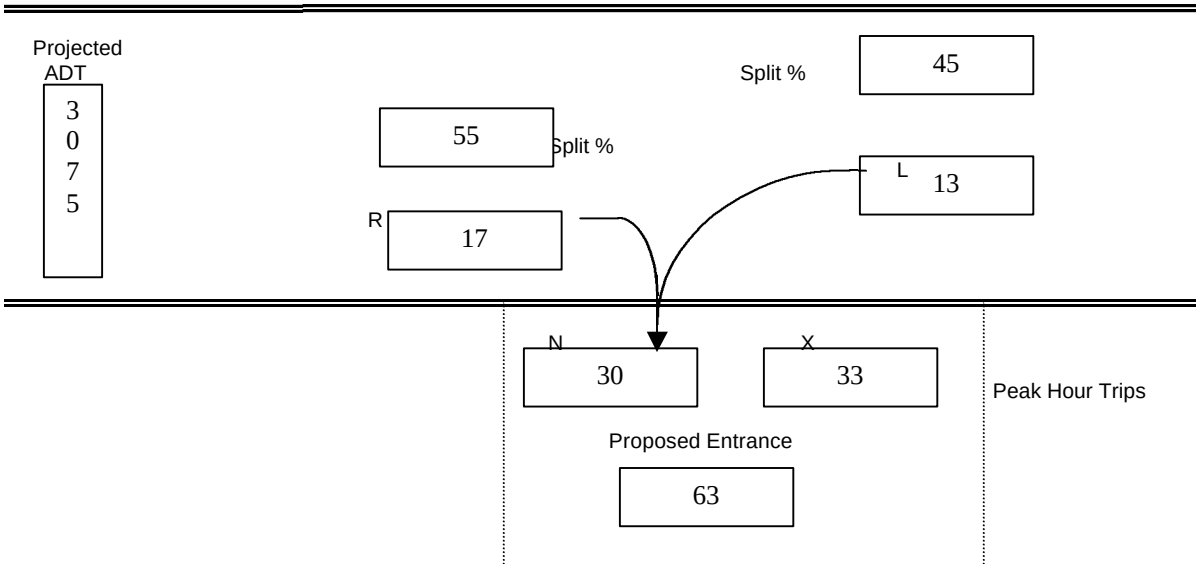
3- Determine the number of right turn and left turn entry movements by using the split percentage (Split %) of the background traffic. If the background traffic is unknown, use 60%/40% as a rough estimate. Multiply the number of entering vehicles (Box N) by the Split% to obtain the peak hour site-generated left and right turns (Box L and Box R).

Right Turns (Box R): **.55 x 30 = 17**
Left Turns (Box L): **.45 x 30 = 13**

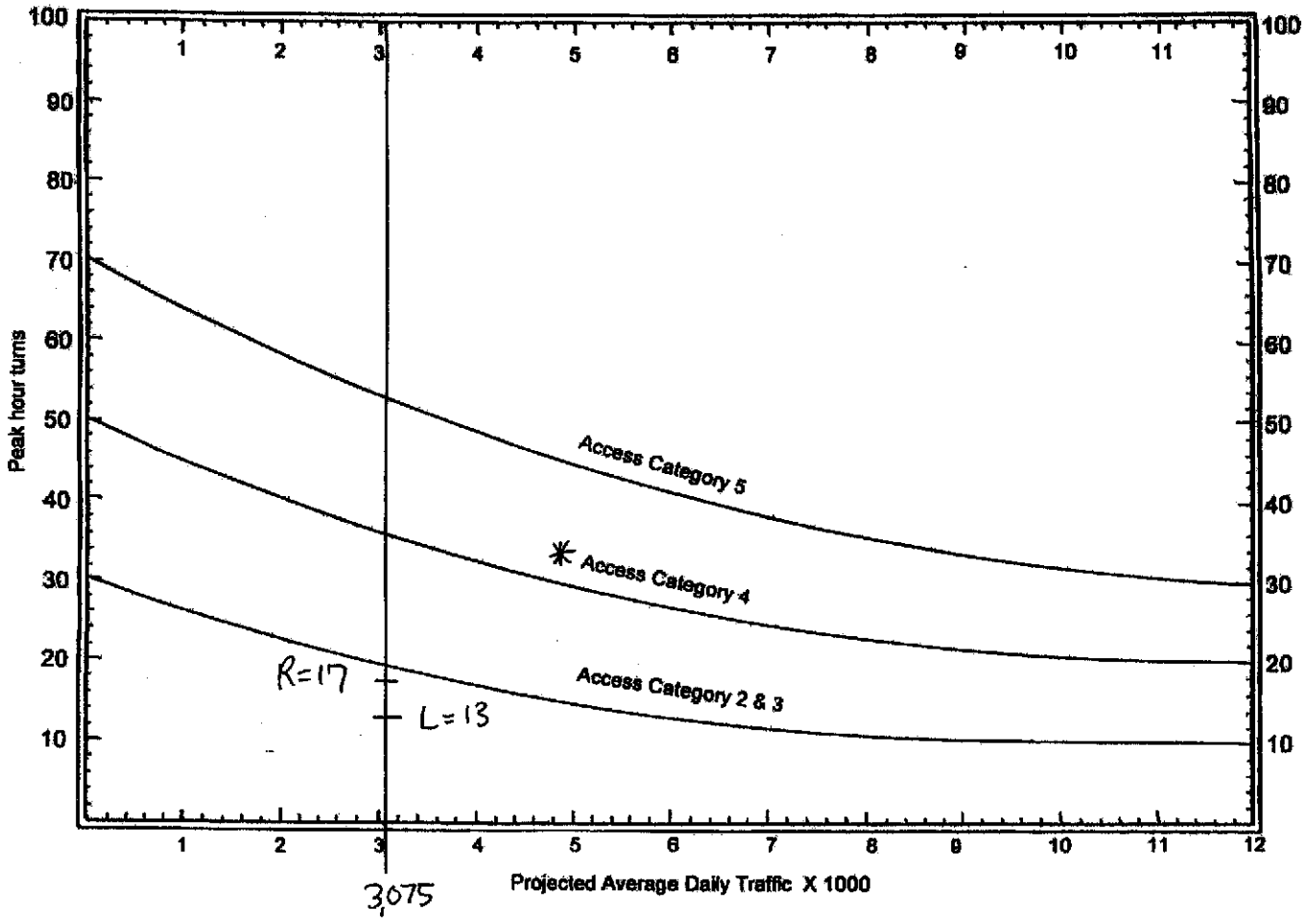
4- Right and left turn analyses may now be made by plotting Box L and Box R on the Y axis, labeled "Peak Hour Turns". Plot the projected ADT on the X axis of the Auxiliary Lane Analysis graph labeled "Projected Average Daily traffic X 1000". The Projected ADT and the road's access category are available from the Powhatan Planning Department.
See Graph on Next Page

5- If the intersection of the lines for the peak hour turns and projected ADT falls above the graph's line for the fronting road's access category, the auxiliary lane(s) is justified. If the intersecting lines fall below the fronting road's access category, then the auxiliary lane(s) is not justified.

Since Rte. 676 is a Category 4 road and the peak hour turns plots fall below the Access Category 4 line, turn lanes are not justified.



Powhatan County Auxiliary Lane Analysis



1. Calculate the peak hour trip ends generated by the site at full build-out by use of the current edition of I.T.E.'s Trip Generation Manual or other recognized source.

2. Assign the entry trips as right or left turns in accordance with the background traffic of the fronting road. If the background traffic is unknown, the turn lane worksheet may be used to provide a rough estimate.

3. Plot these peak hour right and left turn entry movements along the "Y" axis which is labeled "Peak Hour Turns".

4. Obtain the projected Average Daily Traffic (ADT) of the fronting road, and its access category from the planning section. Plot the projected ADT along the "X" axis, which is labeled "Average Daily Traffic X 1000".

5. If the intersection of the lines for the peak hour turns and projected ADT falls above the line for the fronting road's access category, the auxiliary lane is justified.

Appendix B- Trip Distribution and Turn Lane Worksheet
Source: VDOT

Powhatan County
Trip Distribution and Turn Lane Worksheet- EXAMPLE 4

Step

1- Define the land use and the peak hour trips generated by the site at full build-out from ITE's Trip Generation Manual or other recognized source.

Land Use Code: 850
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 p.m. and 6 p.m.
Average Rate: 11.51 (Trip Generation per 1,000 Sq. Feet GFA)
Directional Distribution: 51% entering, 49% exiting

Proposed Entrance: 11.51x 25 tsfga = 287.75 (round to 288)

2- Calculate the trips entering (Box N) and exiting (Box X) the site during the AM and PM peak hours, using the directional distribution found in the Trip Generation Manual. Round up to the next whole number.

Trips Entering (Box N): 288 x .51 = 146.88 (round to 147)
Trips Exiting (Box X): 76 x .49 = 141.12 (round to 141)

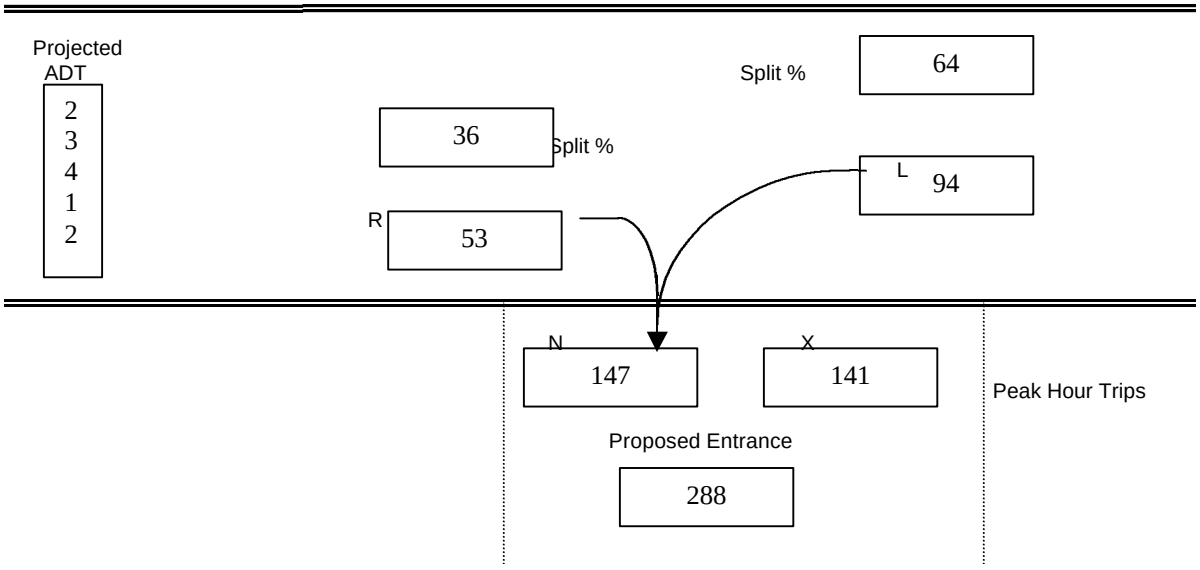
3- Determine the number of right turn and left turn entry movements by using the split percentage (Split %) of the background traffic. If the background traffic is unknown, use 60%/40% as a rough estimate. Multiply the number of entering vehicles (Box N) by the Split% to obtain the peak hour site-generated left and right turns (Box L and Box R).

Right Turns (Box R): .36 x 147 = 53
Left Turns (Box L): .64 x 147 = 94

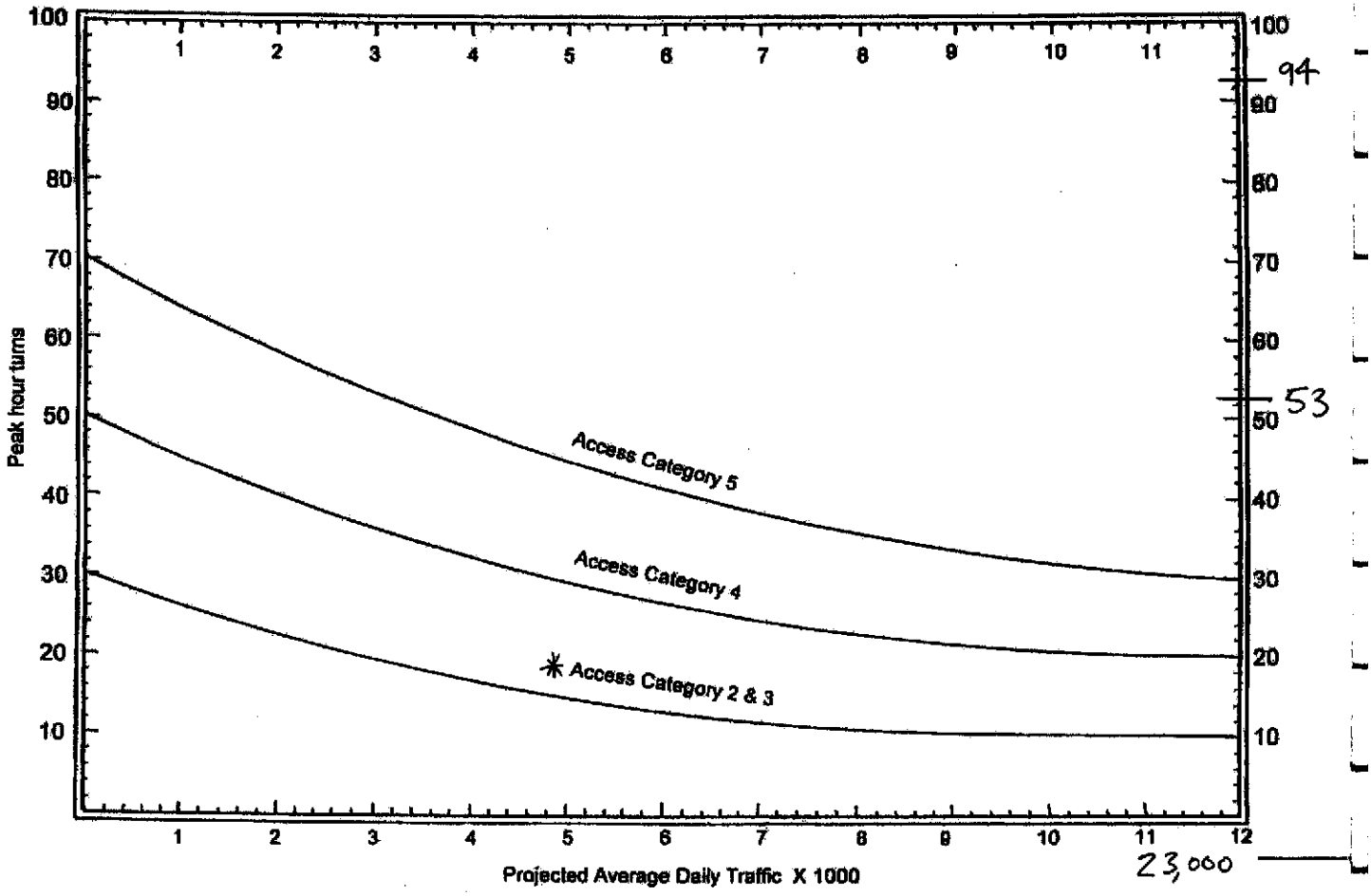
4- Right and left turn analyses may now be made by plotting Box L and Box R on the Y axis, labeled "Peak Hour Turns". Plot the projected ADT on the X axis of the Auxiliary Lane Analysis graph labeled "Projected Average Daily traffic X 1000". The Projected ADT and the road's access category are available from the Powhatan Planning Department.
See Graph on Next Page

5- If the intersection of the lines for the peak hour turns and projected ADT falls above the graph's line for the fronting road's access category, the auxiliary lane(s) is justified. If the intersecting lines fall below the fronting road's access category, then the auxiliary lane(s) is not justified.

Since Rte. 60 is a Category 2 road and the peak hour turns plots fall above the Access Category 2 line, turn lanes are justified.



Powhatan County Auxiliary Lane Analysis



1. Calculate the peak hour trip ends generated by the site at full build-out by use of the current edition of I.T.E.'s Trip Generation Manual or other recognized source.

2. Assign the entry trips as right or left turns in accordance with the background traffic of the fronting road. If the background traffic is unknown, the turn lane worksheet may be used to provide a rough estimate.

3. Plot these peak hour right and left turn entry movements along the "Y" axis which is labeled "Peak Hour Turns".

4. Obtain the projected Average Daily Traffic (ADT) of the fronting road, and its access category from the planning section. Plot the projected ADT along the "X" axis, which is labeled "Average Daily Traffic X 1000".

5. If the intersection of the lines for the peak hour turns and projected ADT falls above the line for the fronting road's access category, the auxiliary lane is justified.

GUIDELINES FOR A TRAFFIC IMPACT STUDY

Purpose

A traffic impact study assesses the impact of a proposed development, zoning change, or special use approval on the transportation system. Its purposes are (1) to ensure that proposed developments or zoning changes do not adversely affect the existing transportation network, (2) to identify any traffic problems associated with access from the site to the existing transportation network, (3) to outline solutions to potential problems, and (4) to present improvements to be incorporated into the proposed development.

These traffic impact study guidelines are based on nationally accepted practices and are the minimum accepted by VDOT. Local jurisdictions may adopt more stringent guidelines, in which case they will become VDOT's standard for acceptance. These guidelines, which were developed to ensure consistent traffic impact studies, should enhance the efficiency of staff reviews as well as provide the owner/developer with information regarding "accepted" technical procedures. While these guidelines cover most developments, there may be cases in which the local jurisdiction or VDOT may require a more comprehensive study that differs from these guidelines.

Responsibility for Traffic Impact Studies

The owner/developer has the responsibility for assessing the traffic impacts associated with a proposed development. The local jurisdiction and VDOT serve in a review capacity. The local jurisdiction and VDOT should specify whether a traffic impact study is required, the extent of the study area, and any specific issues should be addressed (i.e., safety, accidents, truck traffic). This determination should be made as soon as possible in the rezoning or preliminary site plan stage.

If a traffic impact study is required, the applicant will be responsible for submitting a formal traffic impact report. The applicant will also be responsible for all data collection efforts required in preparing a traffic impact study, including current peak period turning movement traffic counts. Current peak period turning movement counts are traffic counts that have been collected within one year of the zoning or subdivision application. The local jurisdiction or VDOT, at its discretion, may request the applicant to adjust the peak hour turning movement counts in order to account for seasonal variations in traffic or other localized factors. In addition, the applicant will be responsible for ensuring that any submitted site plans meet the minimum state and local standards for geometric design. The study should be conducted only by an individual or firm that is qualified in traffic/transportation engineering.

Upon receipt of a draft traffic impact analysis report from the local planning staff, VDOT will review the study data sources, methods, and findings and provide comments back to the local government. The local government staff will pass the comments back to the applicant or the applicant's traffic consultant. The applicant will then have the opportunity to incorporate necessary revisions prior to submitting a final report to the Planning Commission. This information will also

be provided to the Board of Supervisors before they reach a decision regarding the proposed development.

Determining the Need for a Traffic Impact Study

The reviewing agencies should have the discretion to determine when a traffic impact study is needed. The need for a traffic impact study should be evaluated based on conditions surrounding the individual development. The site specific conditions that should be considered include:

1. The potential impact upon the local and regional road networks.
2. The capacity and level of service on the adjacent roadways that will serve the development.
3. Roadway geometrics.
4. The type and size of the proposed development.
5. Traffic operations at all intersections which provide access to the site.
6. Issues of safety and/or traffic operation, or within the public right-of-way.
7. The site generates or attracts 100 total trips per hour during the adjacent street peak hour. Note: 100 vehicle trips may change the level of service on nearby intersections.

VDOT and/or the local jurisdiction may require a group of developers to jointly sponsor a traffic impact study on a section of highway where many independent developments are planned. The results of this study will be the basis for determining improvements and levels of participation by each developer.

Traffic Impact Study Contents

A traffic impact study prepared for a specific site should follow the format shown in Table 5-1 and explained in the chapters that follow. This is a general outline that can be used for most site studies; however, some proposed developments may require a more comprehensive study (e.g., environmental impacts may need to be included).

Table 5-1

Traffic Impact Study Contents

1. INTRODUCTION
   - A. Site location and Study Area
   - B. Existing and Proposed Site Uses
   - C. Existing and Proposed Nearby Uses
   - D. Existing Roadways and Programmed Improvements
2. ANALYSIS OF EXISTING CONDITIONS
   - A. Daily and Peak Hour(s) Traffic Volumes
   - B. Capacity Analyses at Critical Points
   - C. Levels of Service at Critical Points
3. ANALYSIS OF FUTURE CONDITIONS WITHOUT DEVELOPMENT
   - A. Daily and Peak Hour(s) Traffic Volumes
   - B. Capacity Analyses at Critical Points
   - C. The analysis can include any programmed improvements that will be in place by the future year.
   - D. Levels of Service at Critical Points
4. TRIP GENERATION
5. SITE TRAFFIC DISTRIBUTION AND TRAFFIC ASSIGNMENTS
6. ANALYSIS OF FUTURE CONDITIONS WITH DEVELOPMENT
   - A. Future Daily and Peak Hour(s) Traffic Volumes
   - B. Capacity Analyses at Critical Points
   - C. The analysis should include those additional improvements that will be proffered by the developer.
   - D. Levels of Service at Critical Points
7. RECOMMENDED IMPROVEMENTS
   - A. Proposed Improvements
   - B. Capacity Analyses at Critical Points (with improvements)
   - C. Levels of Service at Critical Points (with improvements)
8. CONCLUSIONS